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No. 15

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USSR REPORT  
LIFE SCIENCES  
BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 15

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UDC: 595.782:591.465

CIRCADIAN CHANGES IN PHEROMONE GLAND SECRETORY CELLS OF FEMALE CODLING MOTH (LASPEYRESIA POMONELLA)

Moscow BIOLOGICHESKIYE NAUKI in Russian No 7, Jul 81  
(manuscript received 8 Apr 80) pp 43-46

KOROL', T. S. and CHERNYSHEV, V. B., recommended by the Chair of Entomology, Moscow State University imeni M. V. Lomonosov

[Abstract] While the morphology of the sex pheromone gland of the female codling moth has been studied quite well, circadian changes in pheromone gland cells have not been investigated, although it has been established that there is a circadian rhythm to pheromone synthesis in other insects. Caterpillars and pupae from a codling moth population near Groznyy were collected in July 1979; hatched males and females were kept separately in glass jars, 10 per jar, in the laboratory, where a photoperiod of 18h light and 6 h darkness was maintained. The females were studied on the 3d day after hatching, with groups fixed in the morning, afternoon and evening, in formaldehyde and imbedded in paraffin. Three cell features were determined: presence of nucleolus, nature of cytoplasmic vacuoles and granularity, examining 30 cells per section in 4 sections. The first 2 were more marked in the morning and granularity in the daytime. Some assumptions are voiced concerning the interpretation of these findings: change in morphology of secretory pheromone cells is related to functional activity; since characters were positive to varying degrees at all times, there may be restoration of trophic and plastic potential of each functional structure while the entire organ functions, i.e., dissimilar involvement of all structures in these functions. Figures 1; references 16: 9 Russian, 7 Western.  
[49-10,657]



CHANGE IN ANTIBIOTIC ACTIVITY AND SENSITIVITY OF *BACILLUS PUMILUS*  
RELATED TO INTEGRATION AND DISINTEGRATION OF pPL 7065 PLASMID

Moscow ANITBIOTIKI in Russian Vol 26, No 10, Oct 81  
(manuscript received 28 Apr 81) pp 761-763

LUKIN, A. A., KOZ'MINA, L. M. and LYSENKO, A. M., All-Union Scientific  
Research Institute of Genetics and Breeding of Industrial Microorganisms,  
Moscow

[Abstract] These studies were pursued to verify the hypothesis that there is a relationship between the state of pPL 7065 plasmid in the cell, antibiotic production by the bacteria and their resistance or sensitivity to antibiotics. Tests were conducted on plasmid strain ATCC 7065, mutant LK1, LK2 and LK3 cultures of *B. pumilus*, and indicator strains from the collection of the above institute. Antibiotic activity was graded on the basis of size of zones of retarded growth of test bacteria after 24 h of incubation, and the findings were tabulated: ATCC 7065, in which the plasmid is in a free state, synthesized antibiotic with narrow spectrum of action, inhibiting reproduction of only 3 species of Gram-positive bacteria, LK1, with an integrated plasmid, did not affect staphylococcus or micrococcus, but inhibited growth of ATCC 7065 and *Bacillus* sp. 1. LK2, with spontaneous disintegration of the plasmid and change to free state regained the phenotype of ATCC 7065. Plasmid free LK3 produced antibiotic. Because of phenotypic expression of plasmid pPL 7065 in free and integrated states, proper techniques must be used to test integrated plasmids in future studies of the role of plasmid genes in synthesis of antibiotics by sporulating bacteria. References 14: 8 Russian, 6 Western.  
[42-10,657]

UDC: 575.313

CLONING AND RESTRICTION ANALYSIS OF BamHI-EcoRI FRAGMENT OF DNA  
CONTAINING GENES OF *E. COLI* hsd REGION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 259, No 1, 1981  
(manuscript received 27 Nov 80) pp 216-218

ZINKEVICH, V. Ye., SOLONIN, A. S., BOGDARINA, I. G., TANYASHIN, V. I.  
and BAYEV, A. A., academician, Institute of Biochemistry and Physiology  
of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast

[Abstract] On the basis of prior studies of a recombinant molecule containing genes of the M<sup>+</sup>R<sup>+</sup>EcoK system (a phage containing hsd S<sub>k</sub>, hsd M<sub>k</sub> genes of *E. coli*), genes of the same system were cloned here in plasmid vectors, this region of the *E. coli* chromosome was mapped, range and



orientation of hsd in the DNA fragment were determined. Plasmids pBR 322, pBR 325, pIL 203 were used as vectors and DNA of recombinant lambda 642 phage as donor. Plasmid and phage DNA were mixed in a 1:3 ratio. E. coli HB101 cells were transformed with heated DNA and cultured on medium with ampicillin. Cell suspension was treated with lysozyme and EDTA. The final stage consisted of lysis with sodium dodecyl sulfate and after removal of phenol DNA was precipitated from the lysate and sediment checked for EcoRI fragment from lambda 642 phage, there being no transformant containing the complete DNA fragment of donor phage in 500 clones examined. Parts of a G fragment derived by hydrolysis with restriction endonucleases Hind III, Bam HI and pBR 322 plasmid were used to build recombinant molecules. Restriction sites of endonucleases Kpn I, Sal I, Bam HI, Hind III were mapped. Figures 2; references 10: 2 Russian, 8 Western. [56-10,657]

UDC: 576.858.6

# CLONING OF REGION OF GENOME OF MOLONEY'S MOUSE SARCOMA VIRUS CONTAINING ONCOGENE OF THIS VIRUS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 259, No 1, 1981  
(manuscript received 4 Feb 81) pp 219-222

CHUMAKOV, I. M., ZABAROVSKIY, Ye. R., METT, V. L., PRASOLOV, V. S. and KISELEV, L. L., Institute of Molecular Biology, USSR Academy of Sciences, Moscow (presented by Academician Yu. A. Ovchinnikov on 4 Feb 81)

[Abstract] This study was pursued to obtain larger amounts of material for investigation of nucleotide sequences of a human genome homologous with the src genome of Moloney mouse sarcoma (MMS), which is responsible for induction and persistence of transformed infected cells leading to development of sarcoma. In vitro recombination of DNA to be used for cloning and reproduction is the means of obtaining viral DNA, since retroviruses (such as MMS) contain RNA as genetic material and very small amounts of DNA-containing provirus are synthesized. This was done by means of joining polynucleotide ligase DNA of plasmid pBR322 with divided HindIII and SalI and MMS DNA. The results of electrophoresis in agar gel of double-stranded DNA, physical map of recombinant plasmid pI25 and localization of src gene in this plasmid's DNA are illustrated. The findings indicate that no appreciable changes occur in the course of DNA synthesis with regard to nucleotide sequences, in comparison to genomic RNA. Figures 3; references 8: 3 Russian, 5 Western. [56-10,657]

## THERMOSTABLE HYDROGENASE ACTIVITY OF THERMOPHILES IN KAMCHATKA HOT SPRINGS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 259, No 1, 1981  
(manuscript received 9 Feb 81) pp 223-225

BEREZIN, V. I., PINCHUKOVA, Ye. Ye., VARFOLOMEYEV, S. D. and  
BEREZIN, I. V., corresponding member of the USSR Academy of Sciences,  
Moscow State University imeni M. V. Lomonosov

[Abstract] Research material was collected during an expedition to Kamchatka Peninsula, in the area of the village of Pauzhetka, to search for thermophilic hydrogenase producers. A mixed culture of microorganisms was isolated from the soil of thermal springs that presented high hydrogenase activity and its properties were studied. Gas chromatography was used to test hydrogenase activity after suspension of soil samples in distilled water and treatment with ultrasound, using a concentrated supernatant for the tests, after isolation of fractions with hydrogenase activity. The effect of temperature on kinetics of reactions catalyzed by hydrogenase was tested. The optimum temperature for production of molecular hydrogen from reduced methylviologen (reaction substrate) was in the range of 75-95°C. Inactivation of hydrogenases in air at 100°C, during incubation under aerobic and anaerobic conditions (100°C) was exponential. Electrophoresis revealed one protein zone with hydrogenase activity in the presence of reduced methylviologen. The demonstrated high optimum temperatures and unique thermostability of this enzyme warrant further investigation, since these properties are of definite interest with regard to practical applications. Figures 4; references 13: 5 Russian, 8 Western. [56-10,657]

UDC: 547,963.3+615.779.9

## 'BIS-NETROPSIN' AS SELECTIVE INHIBITOR OF DNA-DEPENDENT RNA SYNTHESIS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 259, No 1, 1981  
(manuscript received 13 Mar 81) pp 244-247

RECHINSKIY, V. O., BIBILASHVILI, R. Sh., KHORLIN, A. A.,  
GROKHOVSKIY, S. L., ZHUZE, A. L., KRYLOV, A. S., ZASEDATELEV, A. S.,  
GURSKIY, G. V. and GOTTIKH, B. P., Institute of Molecular Biology,  
USSR Academy of Sciences, Moscow (presented by Academician  
V. A. Engel'gardt on 6 Feb 81)

[Abstract] Bis-netropsin (bNT), which was previously synthesized from the antibiotic, netropsin, was tested as an inhibitor of DNA-dependent RNA synthesis; bNT consists of 2 molecules of a netropsin analogue joined by an aliphatic chain; DNA fragment containing the lac UV5 promoter was

isolated from a specially built pBRS 206 plasmid; E. coli RNA polymerase and T7 phage DNA were isolated. Calf thymus DNA, nonradioactive ribonucleoside triphosphates, ATP, heparin, distamycin A, Whatman DEAE cellulose filters and nitrocellulose BA 85 filters were used. Ligand concentration was measured by spectrophotometry. Curves were plotted of dichroism of bNT bound with thymus DNA, poly(dA).poly(dT), poly(dA-dT) x poly (dA-dT) as a function of quantity of ligand, and of incorporation of cytidine monophosphate in RNA synthesized with phage T7 DNA and DNA fragment containing the lac UV5 promoter. Use of different promoters results in varying degrees of inhibition of RNA synthesis by bNT, i.e., it is selective in its inhibitory action; it is more effective than netropsin or distamycin A. Figures 3; references 12: 3 Russian, 9 Western. [56-10,657]

UDC: 577.157.6

#### ISOLATION, PURIFICATION AND SOME PROPERTIES OF ECO DAM ADENINE DNA METHYLASE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 259, No 6, 1981  
(manuscript received 12 Jun 81) pp 1492-1495

BUR'YANOV, Ya. I., ZAKHARCHENKO, V. N. and BAYEV, A. A., academician, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast

[Abstract] M·Eco dam adenine DNA methylase is among the enzymes present in all previously studied E. coli strains, and it is controlled by the dam gene, but because techniques for complete purification were not refined, descriptions thereof are incomplete, which served as grounds to describe here methods of isolating and purifying this enzyme, and to examine its properties. E. coli B834 cells were used (300 g), molecular weight of M·Eco dam was determined by gel filtration on a column with sefadex G-100, with bovine serum albumin, ovalbumin, chymotrypsinogen A and myoglobin. Purification stages included work with acellular extract, phosphocellulose 1, hydrosylapatite, carboxymethyl cellulose, gel filtration and phosphocellulose 2. Adenine methylase Eco dam was found to be a monomer protein of one polypeptide chain, molecular mass of 23,000, thus being the lowest molecular protein of all known DNA methylases. Site specificity of E. coli adenine DNA methylases was found to be very similar to that of T2 phage. There are interesting implications referable to the problem of protein-nucleic acid recognition to be clarified in future research. Figures 2; references 15: 3 Russian, 12 Western. [55-10,657]

EFFECT OF METHOD OF STORING ACTINOMYCETES IN ISOTONIC SODIUM CHLORIDE ON CULTURAL AND MORPHOLOGICAL PROPERTIES, AND ON ANTIBIOTIC ACTIVITY

Moscow ANTIBIOTIKI in Russian Vol 26, No 8, Aug 81  
(manuscript received 27 Mar 81) pp 578-580

ORLOVA, R. S. and SARTBAYEVA, U. A., Institute of Microbiology and Virology, Kazakh Academy of Science, Alma-Ata

[Abstract] Seven strains of actinomycetes in the blue-violet group--*Act. coelicolor* strains 16, 19, 17 and variants 17/1, 17/65, which synthesize celicomicin, *Act. anthocyaneus*, strain 1321 which produces lithmofungin and *Act. griseoruber*, strain 1618 which produces antibiotic 1618 were used, as well as 20 actinomycetes cultures from the collections of two institutes. Comparison was made of storage under ordinary conditions and in sealed 5 milliliter vials in isotonic sodium chloride, before which the actinomycetes were cultured on optimum media. Evaluation was made of viability, cultural properties and antibiotic activity as related to term and conditions of storage, with cultures stored on solid nutrient medium by the method of periodic reculturing serving as a control. Diffusion and dilution techniques were used. Storage for up to 6 years had no appreciable effect on the main properties or growth, with use of isotonic sodium chloride, and biosynthetic activity was stable for this period of time.

References 10: 7 Russian, 3 Western.

[50-10,657]

UDC: 581

RESTRICTION AND MODIFICATION SYSTEMS OF BACILLUS STRAINS SIMILAR TO BACILLUS SUBTILIS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 258, No 6, 1981  
(manuscript received 28 Apr 81) pp 1457-1459

KOZLOVSKIY, Yu. Ye. and PROZOROV, A. A., Institute of General Genetics, USSR Academy of Sciences, Moscow (presented by Academician A. A. Bayev on 10 Apr 81)

[Abstract] Five strains of soil bacilli sensitive to *Bac. subtilis* phages (Nos 1532, 1621, 1642, 1801 and 1918), which restrict growth of  $\phi 105$  phage, were tested. Titers of nonmodified and modified  $\phi 105$  phage on a subculture of *Bac. subtilis* 168, the 5 phage-restricting strains and *Bac. subtilis* R are tabulated to determine whether all strains had the same restriction-modification system. The 5 tested strains were found to have a total of four restriction and modification systems--No 1642 had one inherent system, Nos 1532 and 1621 probably had identical systems, No 1801 is assumed to



have 2 such systems, one of which is identical to that of No 1918. Taxonomically, the isolated bacilli were very similar, if not identical, to *Bac. subtilis* 168 according to the homology of their DNA. These 4 restriction-modification systems were also compared to systems of some *B. subtilis* strains and similar bacilli, named *Bac. subtilis* R by cross-infection with a strain having the *Bsu* R system, which showed that the latter is not identical to the tested strains. References 6 (Western).  
[58-10,657]

UDC: 575.116.4+575.173

CLONING AND CHARACTERISTICS OF UNIQUE *DROSOPHILA MELANOGASTER* GENE  
SITUATED IN REGION OF CUT LOCUS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 258, No 6, 1981  
(manuscript received 19 Mar 81) pp 1459-1462

CHURIKOV, N. A., NAUMOVA, A. K., ZELENTOVA, Ye. S. and GEORGIYEV, G. P.,  
corresponding member of the USSR Academy of Sciences, Institute of  
Molecular Biology, USSR Academy of Sciences, Moscow

[Abstract] Although *Drosophila melanogaster* has been studied the most, with regard to genetics, of all higher organisms, there have been no reports of cloning DNA fragments corresponding to its genes situated in genetically interesting loci of the chromosome. RNA used for clone selection was first hybridized with total *drosophila* DNA, with removal from labeled RNA of sequences transcribed from replicas. Such RNA was then hybridized with clones containing *Hind* III fragments inserted in plasmid pBR322. Tracer-binding clones were selected, RNA synthesized on clone DNA and hybridized with *drosophila* chromosome preparations. One of the clones (H55) contained locus 7B3-4 of the X chromosome where the cut gene is located and this gene was the subject of more detailed study. The boundaries of its locus were determined, transcripts of the unique and recurrent parts were submitted to autoradiography and gene sequences were mapped. The cloned gene has a distinctive organization, consisting mainly of a large initial exon and intron with unique sequences, and terminal exon of recurrent DNA; many other genes present the same sequence on their 3' ends. The part of the sequence that is not translated in mRNA constitutes a separate exon, named a "suffix" sequence, which had not been previously encountered and whose significance is not known. Figures 4; references 7 (Western).

[58-10,657]



## SUCCINATE- AND NOREPINEPHRINE-REGULATED NEURONAL CHOLINORECEPTOR FUNCTION IN MOLLUSKS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 258, No 6, 1981  
(manuscript received 12 Jan 81) pp 1466-1469

ANDREYEV, A. A., VUL'FIUS, Ye. A., KONDRASHOVA, M. N. and VEPRINTSEV, B. N.,  
Institute of Biological Physics, USSR Academy of Sciences, Pushchino,  
Moscow Oblast (presented by Academician P. G. Kostyuk on 29 Dec 80)

[Abstract] Neurons from the large and small parietal ganglia of the pond snail, *Limnaea stagnalis* submitted to proteolysis were the material studied. Responses to acetylcholine were tested with different concentrations of succinate, and isocitrate using substrates without and with norepinephrine and ouabain, which were found to attenuate responses significantly, as compared to media without these agents. The protective action of norepinephrine with high concentrations of succinate could be attributed to its regulatory influences on energy metabolism, and more specifically activation of protein kinases, as well as phosphorylation of cholinoreceptors and discharge of  $Ca^{2+}$  from intracellular reservoirs. Decrease in neuronal sensitivity to acetylcholine with the use of ouabain, norepinephrine mixed with succinate or isocitrate, or succinate alone in low concentration may be due to desensitization. It is theorized that there is an additional branch in the known cycle of cholinoreceptor conversions. Figures 1; references 12: 9 Russian, 3 Western.  
[58-10,657]

UDC 575.858

## MICROINJECTION OF VIRUSES INTO EGGS AND EMBRYOS OF ANIMALS: INTEGRATION OF BIRD SARCOMATOUS VIRUS GENOME INTO DNA OF DROSOPHILA MELANOGASTER

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 258, No 5, 1981  
(manuscript received 12 Jan 81) pp 1224-1227

GAZARYAN, K. G., SHAKHBAZYAN, A. K., NEZNANOV, N. S., SMIRNOVA, S. G.,  
KISELEV, F. L., TATOSYAN, A. G. and SPITKOVSKIY, D. D., Moscow State  
University imeni M. V. Lomonosov; Institute of Molecular Genetics, USSR  
Academy of Sciences, Moscow; and All-Union Oncological Scientific Center,  
USSR Academy of Medical Sciences, Moscow

[Abstract] Intact virus of Rous's sarcoma of birds was administered by microinjection into eggs of *Drosophila melanogaster* in the stage of 4-16 nuclei. The experiments were conducted with the Oregon laboratory line of *Drosophila melanogaster*; synchronously developed eggs in an installation for proportioned microinjection were used for the microinjection. A total

of 48 of 513 fruit flies had normal phenotype after the injection. Crossing of these 48 flies did not reveal any phenotype deviations from the norm. Crossing of abnormal specimens showed phenotypic deviations similar to necroses on different parts of the body. Only one mutation with an abnormal eye disk was obtained from all specimens with deviations from the norm. This mutation turned out to be recessive with incomplete penetration. As a result of injection Rous's sarcoma virus, one copy of the provirus molecule was located in the genome of *Drosophila* in the DNA of mutant flies and this mutation was passed on to progeny of the mutant flies. The mutant was the result of integration of viral DNA into the genome of sexual cells of *Drosophila* which was synthesized in the cytoplasm from the matrix of the viral RNA by reverse transcription. The D genome of the Rous sarcoma virus was integrated for the first time into a genome remote from the animal host. Artificial integration of the virus into the genome of *Drosophila* was also shown for the first time. Figures 3; references 13: 3 Russian, 1 Czech, 9 Western.  
[358-6521]

UDC 576.851.48.097.29:575

# GENETIC CHARACTERISTICS OF F-LIKE p-AP10-2 PLASMID CONTROLLING SYNTHESIS OF THERMOSTABLE ENTEROTOXIN IN *E. COLI* CELLS

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 91, No 2, Feb 81 (manuscript received 13 Jun 80) pp 210-212

BUYANOVA, N. I., SHCHIPKOV, V. P. and PEKHOV, A. P., Chair of Biology and General Genetics, Peoples Friendship University imeni Patrice Lumumba, Moscow

[Abstract] The genetic characteristics of thermostable enterotoxin, or Ent-plasmid, were studied after its transfer to the cells of K-12 non-plasmid strains of *E. coli*. Double plasmid transconjugates, investigated for sensitivity to the MS2 phage and the effectiveness of the  $F^l$ -lac<sup>+</sup> plasmid transferred to cells of K-12 nonplasmid strains of *E. coli*, were produced to determine the capability of labeled p-AP10-2 plasmid to inhibit the fertility functions of the  $F^l$ -lac<sup>+</sup> plasmid. Analysis of the transconjugates that retained both the p-AP10-2 and  $F^l$ -lac<sup>+</sup> plasmids showed that the Ent-plasmid has the same capability as the  $F^l$ -plasmid. Subsequent investigation of individual clones of double transconjugates crossed with the appropriate K-12 strains of *E. coli* showed independent transfer of each of two coexisting plasmids. The p-AP10-2 plasmid is shown to be a conjugative F-like plasmid belonging to the FI incompatibility group. References 11: 3 Russian, 8 Western.  
[341-6521]

## RECOVERY OF HYBRID PLASMIDS CONTAINING BACILLUS SUBTILIS GENES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 3, May-Jun 81  
(manuscript received 4 Apr 80) pp 275-279

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[Abstract] Lysine-deficient ( $lys^-$ ) and tryptophan-deficient ( $trp^-$ ) *B. subtilis* mutants served as the experimental model, and *E. coli* PBR 322 plasmid was used for amplification of *B. subtilis* DNA. DNA was isolated from *B. subtilis* and *E. coli* plasmids; the specimens were submitted to electrophoresis in glass tubes containing batches of 10 micrograms each. DNA ligase was used to join *B. subtilis* DNA with restricted PBR 322 plasmid, and the obtained plasmid DNA served to transform *E. coli* C-600 cells. Characteristics of bacterial strains used, and transforming activity of plasmid DNA submitted to different treatments, transformants obtained (*B. subtilis*  $trp^+$ ,  $lys^+$ ; *E. coli*  $trp^+$ ) and transforming activity of different preparations of *B. subtilis*  $lys^-$  cellular DNA are tabulated. Restrictase treatment diminished transforming activity of plasmids, but priming with ligase reaction restored it. Causes of diminished yield of transformants with use of hybrid plasmid are discussed. Three clones were obtained, two of *E. coli* containing hybrid plasmids with fragments of *B. subtilis* DNA involved in lysine synthesis and one with the DNA fragment controlling tryptophan synthesis. Figures 4; references 11: 3 Russian, 8 Western.  
[79-10,657]

UDC: 576.8

## NEW BRANCH OF MICROBIOLOGY--MYCOPLASMOLOGY

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 43, No 3, May-Jun 81  
(manuscript received 3 Apr 80) pp 393-404

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[Abstract] Mycoplasmaology was officially recognized as an independent discipline at a conference of mycoplasmaologists (Freiburg, 1978) and the Congress of Microbiology (Munich, 1978). It is concerned with a new taxon, the Mollicutes class which is very important in biology, medicine, phytopathology and veterinary science. The Mollicutes class (name given by D. Edward and E. Freundt) refers to 1 order of Mycoplasmatales with 3 families--Mycoplasmataceae, Acholeplasmataceae, Spiroplasmataceae and 2 genera with undetermined taxonomic place--*Thermoplasma acidophilum* and

Anaeroplasm; they are minute prokaryotes with distinctive features (listed). Antigenic heterogeneity of membranes of *Mycoplasma pneumoniae*, *M. neurolyticum*, *M. mycoides* subsp. *capri*, *M. hominis*, *M. fermentans*, *Acholeplasma laidlawii* and some ureaplasma are tabulated and pathogenicity factors of mycoplasma are listed. Mycoplasmataceae have two known genera (*Mycoplasma*-- over 50 species) and *Ureaplasma* (8 serotypes). The dominant pathogenicity factor is believed to be the close bond between the mycoplasmal and host membranes, which could conceal the mycoplasma by the host's antigens and make it possible for immunopathological reactions since the mycoplasma are inaccessible to host defense factors. The different phases of interaction between mycoplasma and cells are discussed, and examples of the first phase of interaction, as well as interaction of mycoplasmas with phagocytic cells are listed. There appears to be confirmation of the authors' hypothesis on the role of stable L forms as a stage in the phylogenesis of Mollicutes. References 43: 6 Russian, 37 Western. [79-10,657]

## BIONICS

### SOVIET SCIENTIST SEES VIBRATION RESONANCE AS SOURCE OF FUTURE TECHNOLOGY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Nov 81 p 4

[Article by Ye. Yakovich: "An Era of Quantum Machines?: A Claim for the Future"]

[Text] "In principle, it is possible to make railroad cars move without a locomotive -- mechanical energy will be delivered to their wheels by the rails themselves. Or, to create a motor vehicle with a flywheel storage cell which, with one unloading, will be able to run 1500 to 1700 kilometers . . . "

As if having sensed our disbelief in this forecast, the director of the Donetsk Branch of the Scientific-Research Mining Institute and candidate of engineering sciences, N. Garmash, hastened to add here:

"Of course, these will be special machines and mechanisms. In any case, the conditions of their operation will have to be calculated with the assistance of the mathematical equipment of quantum mechanics . . . "

"Quantum mechanics? But its laws are applicable only to phenomena of the micro-world -- at the level of atoms and molecules. But here we are talking of mechanisms of many tons . . . "

"We also thought that way until we found out otherwise. In fact, it all began with an ordinary belt conveyor for transporting dirt at open pits . . . "

"Created in a laboratory, this conveyor was a surprise under testing. As the belt speed reached a certain amount, the machine began to shiver as with a fever. The verdict of the specialists was simple: the cause of it all was resonance between the belt and the supports. How could this be avoided? All of the measures that the developers could think up either complicated the design or required additional expenditures of energy."

"The most vexing thing," recalls Nikolay Zakharovich, "was that these tests revealed a tempting detail: resonance practically . . . eliminated friction. If, while doing this, it didn't eliminate the machine itself right away!"

To tell the truth, what was "vexing" to the scientist was not very clear to us. Of course, in the cold language of scientific formulas, resonance is "the response of material systems to external perturbation." But we know that this "response" most



often is destructive. A bridge that collapses under a column of soldiers marching in step, a glass that breaks from the sound of a violin at a distance, or turbines that go haywire at a certain number of revolutions -- a large number of such examples could be introduced.

"And meanwhile," continues N. Garmash, "they indicate that our memory is selective. Take, for example, oscillatory circuits in radios, electronic resonators, vibrating screens, or vibration pile drivers -- here, resonance "works" as a creative force. If it weren't for resonance, many musical instruments would not exist. Thus, our attempt to use the positive character of resonance does not look so foolish. Another thing is that classical mechanics often does not provide the answer as to how to control this phenomenon . . . "

"Is this why you have decided to turn to the methods of quantum mechanics?"

"To some degree, this way was prompted for us by the ill-fated conveyor: it obviously behaved "strangely" -- the speed of the belt, the amount of movement, the energy used under resonance conditions changed by fits and starts and by portions. An analogy with quanta inevitably arose. And we decided to take a risk . . . "

Calculations made with the help of quantum mechanics methods led to surprising results. This same belt conveyor, when the resonance effect was used on it, increased many times its speed and coefficient of useful operation. But still more tempting were the prospects that were being opened up for theoretical and experimental research by scientists.

"For the time being, this research indicates that, having 'taught' machines to work steadily under the sometimes dangerous conditions of resonance, they can be improved considerably. Let us say that productivity can be increased by a factor of tens(!) in rotary excavators and drilling equipment. Other machines -- we will call them quantum machines -- can reach a coefficient of useful operation of up to 100 percent. And simultaneously, they can be made more rapid, more reliable, and more durable . . . "

"Almost like a perpetual motion machine . . . "

"No, we haven't successfully invented a perpetual motion machine: to develop machines to operate under resonance conditions and to maintain those conditions, some kind of energy must be supplied. Another thing is that, judging by calculations, much less of it is required. And it will be expended almost without loss. Let us say that, in the conveyor, the transmission of movement from drum to belt will be accomplished not by friction, but through the exchange of quanta of energy. In this way, the working speeds, productivity, and length of service of conveyors can be increased by a factor of 8 to 10, and the use of energy can be decreased to a half or a third of what it was . . . "

"And how do you hope to make a railroad car move without a locomotive?"

"For this, there has to be a traveling wave sent along the rails that "feeds" energy to the rotating wheels. And a quantum storage cell for a motor vehicle, while discharging, should store a large part of the energy in the form of elastic deformation of the flywheel . . . "

"Frankly speaking, all this is difficult to imagine."

"Not only for you, but also for many specialists. When, in 1940, in Washington State, there was a collapse of the Takoma Canal Bridge, which had been designed according to the strict rules of engineering science, there was considerable bewilderment. The reason for the catastrophe -- the wind -- was distinguished neither by special force nor by violence. Nevertheless, the vibrations caused by this wind, coinciding with the structure's own vibrations, acquired destructive power. Figuratively speaking, it was as if the resonance took in its hands all the energy spread over a large mass of air. And now, imagine that we have begun, with the aid of resonance, to accumulate such energy in machines and mechanisms -- of course, not carrying it up to destruction. On this basis, it will be possible to create mechanical quantum generators, accumulators of mechanical energy, transformers, and amplifiers."

"And all this through the methods of quantum mechanics?"

"Let's don't 'take the bread away' from the designers too soon; the creation of quantum machines also requires conceptually new solutions from them. The calculation methods, however good they are, remain only a tool for analysis, a compass that shows the way to investigate. Moreover, we still do not know how widely applicable the quantum approach is. It is not exceptional in that it forces the reexamination of many views not only in engineering, but in other fields . . . "

"In which ones for example?"

"One such field is biology. Let us say that scientists up to now have argued about why a dolphin, on a 400-kilometer 'run,' uses only 100 grams of fat. But if one assumes that, between its subcutaneous blood vessels and the waves flowing along its body, there is a resonance bond, then the high degree of economy becomes understandable. Certainly, other biological subjects also use resonance to avoid unnecessary expenditures of energy. It is worth thinking about this: is it possible that this may be the very reason that our heart doesn't 'get tired' pushing such a large amount of blood? . . . "

The scientists don't like to overrate their work. But they have applied the methods of quantum mechanics to the world of big technology. The unusual conveyor is already operating, and calculations have been made for many other mechanisms. But this is only the beginning: at present they are only learning to control a formidable phenomenon, trying to transform resonance into a creative force. It is dangerous to be in too much of a hurry in making forecasts. But, is it perhaps possible that these investigations will start a new era of quantum machines?

9645

CSO: 1861/94

UDC: 575.113:599.323.4

PEROMONAL INHIBITOR OF AGGRESSIVENESS IN C57BL/6 MALE LABORATORY MICE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 261, No 1, Nov-Dec 81  
(manuscript received 5 Jun 81) pp 211-213

NOVIKOV, S. N. and SAVVATEYEV, V. Yu., Institute of Physiology  
imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad (presented by  
Academician V. N. Chernigovskiy on 28 May 81)

[Abstract] Reference is made to previous studies of pheromonal control of aggressive behavior in mice, with determination of pheromonal promoter and inhibitor of such behavior, the hypothesis being that the degree of activity of these factors is involved in such behavior. A study was made of 8-week-old puberal male CBAB6F<sub>1</sub> mice confronted by intruders, who were males of the same age and genotype castrated at the age of 21 days, with urine of males from one of two genealogically-unrelated strains (CBA/Sto or C57BL/6Sto) applied to the anogenital region. Analysis of aggressive behavior, recorded for 10-min test periods, revealed that the latency period of attack was longer in the B6 variant while total attack time was shorter than in the control, where water was used instead of urine. Tests with CBA urine did not differ from the control. The studies show the presence of a pheromonal inhibitor in the urine of C57BL/6 male mice—a strain that is anomalous in androgen-dependent features—and a depression of the activity of a pheromonal promoter of aggression; this confirms previous reports of pheromonal deviations in this genotype. The route of future investigation of pheromonal inhibitor of aggressiveness is suggested: testing the tissue-specific response to testosterone and its metabolites in seminal vesicles and coagulation gland as the most likely sources of this inhibitor.

References 15: 3 Russian, 12 Western.

[69-10,657]

UDC 595.792.13:591.5

SEARCH BEHAVIOR OF *LOPHYROPECTUS LUTEATOR* (HYMENOPTERA, ICHNEUMONIDAE)  
AT DIFFERENT POPULATION DENSITIES OF HOST *NEODIPRION SERTIFER*

Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 60, No 5, May 81  
(manuscript received 12 May 80) pp 708-710

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[Abstract] The behavioral reactions of *Lophyropectus luteator* were studied in the region of its low population density and these reactions were compared to those of parasites that are numerous in the same region. Under experimental conditions the females of the parasite responded to host population density in the same manner as was previously noted in an abundant species in that the number of eggs laid increased as the host density in the group increased. Old females are capable of finding single larvae, remain for a long time within their habitation and then move to more numerous groups of hosts. The number of specimens infected by the endoparasite increases as the host population density in the group increases and the dependences are described as a linear regression equation with negative free term. Another specialized parasite *Exenterus abruptorius* also infects the European pine sawfly as a function of host population density. The behavioral responses to host population density are identical in both species of parasites and these responses permit the parasites to control the host population. Figures 4; references 8: 2 Russian, 6 Western. [368-6521]

## SURVEY OF EXPANDED POSSIBILITIES OF SYNTHESIZING COMPLEMENTARY DNA BY REVERSE TRANSCRIPTION

Moscow USPEKHI SOVREMENNOY BIOLOGII in Russian Vol 91, No 3, May-Jun 81  
pp 323-333

KAVSAN, V. M.<sup>11</sup> and KISELEV, L. L., Institute of Molecular Biology and Genetics, Ukrainian Academy of Sciences, Kiev, and Institute of Molecular Biology, USSR Academy of Sciences, Moscow

[Abstract] Methods of obtaining cDNA [complementary DNA] from template and other diverse RNA are reviewed, which involve initiation of reverse transcription by means of the enzyme, revertase. Oligothymidylic acid complementary to the poly-A-segment of mRNA is used most often of the homopolymer primers. Other methods involve the use of heteropolymer primers complementary to a specified segment of the RNA template, "scattered" priming using a mixture of oligodeoxyribonucleotides, solid-phase cDNA synthesis (using oligo-dT-cellulose), endogenous primers (tRNA complementarily bound to the 3'-end of a specific locus of viral RNA; 3'-free hydroxyl). The synthesized cDNA is used to identify the primary structure of RNA. There has also been reverse transcription of overall RNA to produce specific sequences of cDNA homogeneous fragments, which are then treated with restrictionase to isolate the needed DNA fragments from other cDNA spread over acrylamid gel. Synthesized cDNA are used for specific molecular hybridization in studies of incidence of genes, metabolism of mRNA and heterogeneous nuclear RNA, mRNA structure, in vitro transcription of chromatin, isolation and cloning of genes. The three major areas of application of reverse transcription are: to synthesize so-called molecular probes (in biology, genetics, virology, etc.), identify primary RNA structures and synthesize genes for genetic engineering purposes. References 118: 17 Russian, 111 Western.  
[78-10,657]



## ENVIRONMENT

UDC: 591.511:577.31:595.422

### INTERACTION BETWEEN MOTIVATION AND RHYTHMS IN REGULATION OF BEHAVIOR IN VARROA JACOBSONI OUDEMANS (PARASITIFORMES: VARROIDAE) MITES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian: Vol 258, No 6, 1981  
(manuscript received 1 Apr 81) pp 1508-1510

NEPOMNYASHCHIKH, V. A., Moscow State University imeni M. V. Lomonosov  
(presented by Academician M. S. Gilyarov on 23 Mar 81)

[Abstract] A study was made of interaction between two types of previously reported regulation of behavior timing (oscillators, dilation of intestinal walls by food, bursts of movement, on the one hand, and feedback, on the other) with regard to feeding activity of female gamasid mites on hemolymph of honey bee pupae. A total of 34 mites were used, and they were observed for 3 to 8 h; observation time was broken down into even intervals, each including one attempt at feeding, which consisted of two phases—search and final. The first was identified by the attempts to pierce the pupa and lasted from a few seconds to a few minutes, even if it did not result in feeding. The second phase started after one of the piercing actions and was identified by intestinal contractions; it lasted 0.1 to 15 min with intervals of 4 min to 3 h between attempts, which demonstrated a specific rhythm in each specimen ranging from 3 to 13.5 min. However, the periods of the rhythm differed, depending on whether or not a piercing attempt led to feeding. Oscillatory processes were found to participate in determining the behavioral rhythm; they differ in capacity for change and are not coordinated in frequency. Figures 2; references 8: 3 Russian, 5 Western. [58-10,657]

COMBINED EFFECT OF CHLOROQUINE AND QUININE IN MALARIA AMONG RODENTS  
(PLASMODIUM BERGHEI)

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITAR'NYYE BOLEZNI in Russian  
Vol 49, No 6, Nov-Dec 80 (manuscript received 27 Feb 80) pp 22-27

MOSHKOVSKIY, Sh. D. and DADASHEVA, N. R., Institute of Medical Parasitology  
and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health,  
Moscow

[Abstract] The effect of chloroquine in combination with quinine on malaria among mice was investigated to determine the efficacy of the combination. A sensitive strain of Plasmodium berghei and a strain of that parasite with reduced sensitivity to chloroquine were administered to inbred white mice. Single administration of chloroquine and quinine showed a marked improvement in symptoms as did administration of chloroquine alone. Administration of chloroquine and quinine in four daily doses from the onset of infection showed a marked effect in control of the malarial parasites. The final effect of the chloroquine-quinine combination was higher than in the group that received only chloroquine. The effect of chloroquine is intensified upon the addition of quinine without initial inhibition in the strain of P. berghei with reduced sensitivity to chloroquine and increased sensitivity to quinine. Figures 3; references 4: 2 Russian, 2 Western.  
[361-6521]

CHARACTERISTIC FEATURES OF RELATIONSHIPS OF LEISHMANIA MAJOR WITH MAMMALS  
OF DIFFERENT SPECIES

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITAR'NYYE BOLEZNI in Russian  
Vol 49, No 6, Nov-Dec 80 (manuscript received 28 Jun 80) pp 42-49

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Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR  
Ministry of Health, Moscow

[Abstract] The susceptibility of five wild animal species, including the red-tailed Libyan jird [red-tailed peschanka], midday gerbil [midday peschanka], hedgehogs, house mice and Severtsov's jerboa, to Leishmania major was studied experimentally. The animals were distinguished by non-selective susceptibility and selective susceptibility according to the different virulence of the infecting agent. Susceptibility to high- and low-virulent clones and also to low-virulent strain 780089 were evaluated. Gerbils showed low sensitivity to infection, while the other species showed high sensitivity. The sensitivity of the vertebrate host to the pathogenic

agent is seen as a possible indicator to estimate the capability of the animal to maintain populations of the pathogenic agent in Leishmaniasis major. The great gerbil is seen as a highly reliable source of the pathogenic agent, the red-tailed jird, the midday gerbil and man are seen as low-reliable sources and Severtsov's jerboa, the house mouse and the hedgehog are seen as unreliable sources in spread of Leishmania major. References 27 (Russian).  
[361-6521]

UDC 599.323.4:591.521

ACTIVITY, MOBILITY AND UTILIZATION OF SPACE OF STRAW STACKS BY COMMON  
VOLES (RESULTS OF RADIOACTIVE TAGGING)

Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 60, No 5, May 81  
(manuscript received 14 Apr 80) pp 742-750

OKHOTSKIY, Yu. V., KARULIN, B. Ye., LITVIN, V. Yu., DUNAYEVA, T. N.,  
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Microbiology, USSR Academy of Medical Sciences, Moscow

[Abstract] The activity and mobility of common voles and also, the scope and nature of their use of space in straw stacks, were studied in detail. The voles were tagged with Co<sup>60</sup> and diurnal observations were conducted over a period of 1 to 3 days. The animals were occupied an average of 30.8 per cent in 24 hours by activity in hay and straw stacks and the number of activity phases per day averaged 12.2, with average duration of 33 minutes. Activity showed no essential difference during morning and evening hours and the daily run of the animals showed no relationship to sex or the size of the stacks. The daily run within the hay and straw stacks averaged 15 minutes during the activity phase. The voles did not venture more than a distance of 1 to 5 meters from the stacks. The lower layers of stacks were most intensively utilized and over a period of 24 hours the voles rested at 1 to 6 places. Microclimatic and feeding conditions in the hay and straw stacks affected the activity, mobility and pattern of stack utilization. Figures 3; references 24: 21 Russian, 3 Western.  
[368-6521]

## FIELD EXPERIMENT IN RADIOACTIVE TAGGING OF SAND FLIES INTRODUCED AMONG GREAT GERBILS

Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 60, No 5, May 81  
(manuscript received 24 Mar 80) pp 764-770

LEJBROVSKIY, Yu. A., OKHOTSKIY, Yu. V., KARULIN, B. Ye., KULIK, I. L.,  
BOKSHTEYN, F. M., NIKOLAYEVA, G. M., OVCHINNIKOV, I. M. and VINOKUROVA, N. S.,  
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[Abstract] Great gerbils were tagged with radioactive isotopes  $C^{14}$  and  $Co^{60}$  or with dyes to compare both methods of tagging. Sand flies *Phlebotomus andrejevi* that feed on the blood of great gerbils take up the tag and retain it to the second gonotrophic cycle. The number of sand flies flying out of the gerbil burrow were caught and the radioactive labels were counted. The total number of tagged sand flies flying from the burrows of the host animal reaches a maximum by the second night after tagging. The number of tagged sand flies from the burrows varied considerably. No clear dependence between the number of tagged sand flies and the number of animals in the burrow could be established and this fact is explained by a number of behavioral features of sand flies and their main hosts. It is recommended that future studies of the feeding of sand flies on vertebrates in nature be conducted under stricter conditions with the tagged host in a fixed position available for blood sucking and with higher population of sand flies. References 8 (Russian).  
[368-6521]



## MEDICAL DEMOGRAPHY

UDC 614.1(049.32)

### NEW BOOK PROVIDES STATISTICAL INFORMATION FOR PRACTICING PHYSICIANS

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 11, Nov 81 p 71

[Review by V. S. Korolev and Assistant Professor R. K. Marchenko of book "Statistika v zdravookhranении" [Statistics in Public Health] by K. I. Zhuravleva, Moscow, Izdatel'stvo "Meditsina", 1981, 176 pages]

[Text] The library of the practicing physician has been supplemented by a much-needed book written by the chairman of the Department of Social Hygiene and Public Health Organization of the Leningrad Medical Institute of Sanitation Hygiene, Prof K. I. Zhuravleva. The manuals and handbooks on public health statistics written for practicing physicians are extremely lacking today, and the book reviewed here goes a long way to correct this situation.

The book consists of a foreword and seven sections. The material is supplied with illustrations, and it is supplemented by six diagrams and 29 tables.

In his foreword the author validly notes: "Correct statistical analysis of the work of any subdivision and evaluation of the effectiveness of therapeutic and preventive measures and of public health indicators depends in many ways on how well the physician is acquainted with medical statistics. A knowledge of the methods of medical statistics allows us to examine and determine the trends in demographic processes, morbidity, the population's physical development and so on."

The first section of the book is devoted to the role of medical statistics in the physician's practical activities. It defines statistics as a science, it describes the role of public health statistics, and it clearly determines the range of problems requiring public health statistics for their solution.

The second section, "Methodological Problems of Statistical Research in the Activity of a Physician," presents the statistical analysis procedure, which consists of four successive stages. Each stage is described in detail. Using a comprehensible format and graphical examples, the author demonstrates the procedure of calculating relative indicators, dynamic series indicators, the arithmetic mean, the standard deviation, the error of the arithmetic mean and the significance level. Forms of graphical representation and their use in analysis of a statistical set are shown.

The procedure of determining correlations and their use in the physician's practical activities are presented somewhat more weakly in our opinion.

In the third section, "Population Morbidity Statistics," the author defines morbidity as one of the most important criteria of public health, persuasively demonstrating that a physician must have morbidity information to support his practical activity. This section also presents the procedure for calculating various morbidity indicators.

Devoting significant attention to morbidity involving temporary incapacitation, for the purposes of comparison the author refers the reader to morbidity indicators in the former reporting form No 3-1, covering a number of years, and he describes the entries of reporting forms No 16 and 3-1.

All of this has great practical value. However, it should be noted that the classification of forms of morbidity is not very clear. Moreover it would have been suitable to provide the procedure for calculating the economic loss caused by morbidity associated with temporary incapacitation.

Study of demographic processes occurring both in our country and in all the world is now acquiring enormous significance. The fourth section is devoted to practical application of the methods of demographic statistics to public health. This section describes the different ways a population can be broken down into age groups to study its composition and the prospects of its development with the purpose of determining manpower and planning the network of medical, children's preschool and school institutions. Discussing the procedures for calculating the birth rate, mortality, child mortality and other demographic indicators, the author provides his evaluations of them. Much attention is devoted to child mortality as a barometer of the population's physical well-being. The procedure for calculating mortality tables and average lifespan is not as clearly presented.

Validation of social, hygienic and organizational measures conducted on the basis of the results of statistical analysis of various parameters describing the health of children and the activities of children's therapeutic-preventive institutions promotes satisfactory fulfillment of the integrated program for protection of the health of children. In the fifth section of her book Zhuravleva names the criteria by which the health of children is judged, provides the procedure for calculating them and names the forms used for official statistical reporting. The author also dwells on the role of statistics in organization and planning of therapeutic-preventive care for children.

The sixth and seventh sections, devoted to the statistics of obstetric care and protection of the health of women, and to the role of statistics in protection of the health of workers and in planning medical care for them, are well written.

It is a pity that the book does not provide a bibliography on public health statistics recommended for practicing physicians. But the insignificant shortcomings and some of the stylistic errors (page 35) do not diminish the worth of the book. Zhuravleva's work deserves a high evaluation, and it will be of doubtless interest not only to practicing physicians and the workers and executives of public health organs and institutions, but also to instructors and students at medical institutions of higher education.

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11004

CSO: 1840/89

UDC: 616.12-005.4-082

#### CONTROL OF CARDIAC ISCHEMIA IN LITHUANIAN SSR

Moscow KARDIOLOGIYA in Russian Vol 21, No 9, Sep 81  
(manuscript received 2 Feb 81) pp 5-9

YANUSHKEVICHUS, Z. I., Kaunas

[Abstract] Organization of control of ischemic heart disease in Lithuania involves several stages, which are suggested as a standard national system: primary prevention, diagnosis and treatment, rehabilitation and secondary prevention, which are implemented by the following services: epidemiology department, preventive ischemia control outpatient [dispensary] office, preinfarction (ischemia) hospital, mobile ischemia control service (specialized emergency cardiological care), intensive care department, myocardial infarction department, postinfarction (rehabilitation) hospital department, sanatorium and resort therapy department, postinfarction outpatient office, cardiac surgery service—all of which are under the republic-level [Lithuanian] clinical cardiology center. The duties and responsibilities of each of these services are discussed, the key principle being integrated and united control of ischemic heart disease. Figures 1; references 3 (Russian).  
[43-10,657]

UDC: 616.127-005.8-036.11-082:614.061.14(100)

#### REGISTER OF ACUTE MYOCARDIAL INFARCTION IN KAUNAS

Moscow KARDIOLOGIYA in Russian Vol 21, No 9, Sep 81  
(manuscript received 20 Jan 81) pp 72-75

BLUZHAS, I. N., GRAZHULYAVICHENE, R. I., RASTENENE, D. P. and SHESHKYAVICHYUS, A. Yu., Scientific Research Institute of Physiology and Pathology of the Cardiovascular System (director--Prof I. V. Bluzhas) at the Kaunas Medical Institute

[Abstract] Studies of incidence, mortality and lethality of acute myocardial infarction were based on data covering an 11-year period (1969-1979)

in the Kaunas register of acute myocardial infarction, which was set up in accordance with a research program developed by WHO. The number of recorded cases of acute myocardial infarction more than doubled over the above period, incidence per 1000 increased from 1 to 1.67, related hospital deaths constituted 21.2% in 1969 and 18.1% in 1979, fluctuating between these figures during the period studied, overall mortality decreased from 46 to 30.4%, as a result of upgrading all aspects of care--diagnostics, therapy, specialized cardiological emergency service, upgraded training of physicians, active educational work with the public and better organization of work. It is concluded that keeping a register of this disease is beneficial in many respects: it is very informative about incidence, mortality and lethality, and permits comparative evaluation of efficacy of preventive, diagnostic and therapeutic work. References 19: 12 Russian, 7 Western. [43-10,657]

UDC: 616.12-005.4-055.1:313.13(470-25)

LONG TERM STUDY OF INCIDENCE OF ISCHEMIC HEART DISEASE IN SAMPLE OF MALE INHABITANTS OF A MOSCOW RAYON: COMPARATIVE FINDINGS OF RECHECKS ON SAME SAMPLE MADE AFTER 6.5 YEARS

Moscow KARDIOLOGIYA in Russian Vol 21, No 9, Sep 81  
(manuscript received 8 Apr 80) pp 95-99

KOKURINA, Ye. V., CHUBUKOVA, A. L., OSTROVSKAYA, T. P., ILYUSHINA, I. P., ALEKSANDROV, A. A., DOKUCHAYEVA, Ye. A., SAPOZHNIKOV, I. I., SHCHEPKIN, V. V. and METELITSA, V. I., All-Union Cardiological Research Center (general director--Academician Ye. I. Chazov), USSR Academy of Medical Sciences, Moscow

[Abstract] The random number method was used to take 2000 out of the 5107 men 50-59 years old living in Baumanskiy Rayon of Moscow, to form 4 samples of 500 men whose initial examination was performed in 1967. Two of these samples (1000) were rechecked 6.5 years later, by the same method, which included blood pressure, blood serum cholesterol, triglycerides, blood sugar, coagulation index, determination of whether subjects smoked or were obese, electrocardiogram. Of the 1000 men, 656 appeared for the recheck, the others failing to do so for different reasons (death, moved, did not show up). In this period there was increase of ischemic heart disease (myocardial infarction and painless ischemia), as well as most risk factors for such disease. There was an increase in entropy of distribution of ischemic heart disease, EKG changes and risk factors, with age (second examination). Figures 3; references 9: 7 Russian, 2 Western. [43-10,657]



DYNAMIC CHANGES IN INCIDENCE OF MALIGNANT NEOPLASMS AMONG POPULATION OF UKRAINIAN SSR AND ESTIMATION OF PROBABLE LEVEL THEREOF IN NEXT 10 YEARS

Kiev KLINICHESKAYA KHIRURGIYA in Russian No 5, May 81

(manuscript received 20 Feb 81) pp 6-9

PRISYAZHNYUK, A. Ye., Kiev Scientific Research Institute of Roentgeno-Radiology and Oncology

[Abstract] A study was made of the main trends of oncological morbidity and mortality in the Ukraine between 1962 and 1979, and a forecast up to 1990 for male and female populations, for the republic as a whole, as well as broken down for urban and rural population. The incidence of neoplasms of the lip, mouth, esophagus, stomach, colon, rectum, liver, pancreas, larynx, trachea, bronchi, lungs, skin, breast, cervix uteri, other parts of the uterus, ovaries, undetermined female reproductive organs, prostate, urinary bladder, lymphatic and hemopoietic tissue are tabulated for males and females in 1962-1964, 1969-1972 and 1976-1979, the figures indicating a general increase from 1962 to 1979. There was less difference between urban and rural population in 1979 than previously. On the basis of the data obtained for the above 3 time periods, forecasts are made for 1985 and 1990 (254.6+2.02 per thousand and 276.2+2.6 per thousand, respectively, versus 229.9-235.2 cases of malignancy per thousand in 1979). Forecasts are also offered for male and female population separately. The most common localizations of neoplasms will be, as before, the lungs, stomach, skin, lymphatic and hemopoietic tissue among the male population; for the female population they will be the breast, skin, stomach, followed by the lungs, uterus, ovaries, rectum, with the cervix uteri in 8th place, which is a shift from 4th. These data indicate the need to develop certain specialized forms of oncological services and to study etiological factors involved in this growth of some forms of cancer. Figures 2; references 7 (Russian). [47-10,657]

UDC 616-001-02:614.86]-083.98+614.86-083.98

TREATMENT OF HIGHWAY ACCIDENT VICTIMS DURING PREHOSPITAL STAGE

Moscow ORTOPEDIYA, TRAVMATOLOGIYA I PROTEZIROVANIYE in Russian No 7, Jul 81 (manuscript received 25 Nov 80) pp 1-5

IMAMALIYEV, A. S., DADASHEV, Kh. D., KOSMATOV, V. I., BURLADKOV, N. V. and LAVROV, V. N., Chair of Traumatology, Orthopedics and Military Field Surgery, Moscow Medical Stomatological Institute imeni N. A. Semashko

[Abstract] A total of 1,113 highway accidents on the roads of Moscow was studied with respect to treatment by rescue squad crews prior to reaching

the hospital. A total of 45 persons died at the accident scene before the arrival of the specialized rescue squad. The most frequent cause of death was severe open head injuries combined with fractures of various segments of the support-motor apparatus. Multiple fractures of the limbs and pelvis and multiple fractures of the ribs with damage to the pulmonary parenchyma complicated by severe shock were noted in 16 of the victims. First aid was rendered to only 395 of the total number of victims by city automobile inspection officials prior to the arrival of a specialized rescue squad and 130 of the victims were treated by line first aid workers. The specialized resuscitation-traumatological first aid teams are a promising and feasible measure at the accident site and during the trip to the hospital. A scheme is described for treatment of accident victims in a state of shock and with combined and multiple injuries and a scheme is proposed for transfusion at the accident site. Early multiple antishock therapy in conjunction with knowledgeable treatment of bone injuries is an effective means of prehospital treatment of accident victims. References 5 (Russian). [352-6521]

UDC 616.99.001.5(47+57):65.012.2"1981-1985"

#### MAIN PROBLEMS OF PARASITOLOGY AND TASKS OF SOVIET PARASITOLOGISTS FOR PERIOD 1981-1985

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian Vol 49, No 6, Nov-Dec 80 (manuscript received 2 Apr 80) pp 3-10

SOPRUNOV, F. F.

[Abstract] The tasks of Soviet parasitologists are outlined for the period 1981-1985 with respect to problems of parasitic and tropical diseases. Opisthorchosis, echinococcosis, trichinosis, diphyllbothriasis, leishmaniasis and malaria are seen as the parasitological problems most closely related to the country's socioeconomic development. Recommendations are made to expand the profile of parasitologist training, to expand cooperation between parasitological institutions and intensify the contacts of scientific parasitological institutions with parasitologists of the sanitary-epidemiological service to check scientific developments in the practical field. The three main specialties of an experimental parasitologist with broad parasitological profile, a clinical parasitologist and an epidemiological parasitologist should be the main area of multiple training of young people. The experimental parasitologist should have broad parasitological with extensive knowledge in one of the basic directions of parasite cultivation, molecular biology, immunology, genetics or micro-morphology of parasites. The clinical parasitologist should have a good knowledge of pathology and personal experience in diagnosis and treatment of most parasitic and tropical diseases. The epidemiological parasitologist should be trained in theoretical and applied epidemiology of parasitic and tropical diseases and have experience in organization of mass measures to

control these diseases. The field of tropical medicine is faced with problems of protecting Soviet specialists working in hot climates against tropical diseases and protection of the Soviet population against influx of malaria and other tropical diseases from abroad, training of Soviet physicians and scientific workers in tropical medicine abroad and training of medical and scientific personnel from developing countries, recruitment of the nation's personnel who show promise in study of tropical medicine, gathering information on problems of tropical medicine in the developing countries and disseminating the principles of Soviet health with respect to problems of tropical medicine. The efforts of all Soviet parasitologists and scientists in other fields of medicine interested in parasitology should be combined to solve specific problems. Greater attention should be devoted to parasitology and control of parasitic diseases on the part of health organizations.  
[361-6521]

UDC 616.936-036.22(47+57)"1974-1979"

#### IMPORTATION OF MALARIA FROM FOREIGN COUNTRIES TO THE USSR (1974-1979)

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 49, No 6, Nov-Dec 80 (manuscript received 23 Jul 80) pp 10-16

ZHUKOVA, T. A., DUKHANINA, N. N., MAKIYENKO, N. I. and ALEKSEYEVA, Z. M.,  
Institute of Medical Parasitology and Tropical Medicine imeni  
Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] The importation of malaria from abroad into the USSR remains a constant danger for resurgence of malaria in the USSR from imported cases. The severe clinical course of malaria in persons afflicted in the tropics and the high fatality rate caused by late diagnosis of the disease are of important significance in countries where there are no epidemiological consequences of importation of malaria. A total of 11,984 cases of imported malaria, of which there were more than 4,000 cases of tropical malaria and 164 fatalities, was recorded in Europe during the period 1971 through 1976. According to data of the World Health Organization, 4,217 cases of malaria, 26 of the fatal, were reported in European countries in 1978. The Soviet Union recorded 1,884 cases of malaria imported from abroad during the period 1974-1979 and patients with malaria and parasite vectors afflicted in 52 countries were recorded during the same period in the USSR. The highest number of cases of malaria was recorded in 1978, with 404, and the number of cases was 395 in 1979. Many of the cases of malaria were contracted by crews of the fishing fleet during voyages to West Africa and 18 cases recorded during 1978 and 1979 were mainly among foreign students studying in the USSR. Of the 1,017 cases of imported malaria during the period 1977-1979, 582 of them were recorded among foreign citizens. The majority of cases of tropical malaria occurred in large cities due to their larger populations. It is felt that an increase in importation of malaria

both by Soviet citizens and by foreigners visiting the Soviet Union may occur in connection with the deteriorating situation with respect to malaria in the world and, also, the developing economic, cultural and other ties of the USSR with the developing countries. References 28: 26 Russian, 2 Western.  
[361-6521]

UDC 616.993.12-078

SEROLOGICAL AND PARASITOLOGICAL METHODS IN DETERMINATION OF IMPORTED AMEBIASIS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian Vol 49, No 6, Nov-Dec 80 (manuscript received 25 Apr 80) pp 34-39

PRODEUS, T. V. and SOLOV'YEV, M. M. (deceased), Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martynovskiy, USSR Ministry of Health, Moscow

[Abstract] Methods of timely and more complete determination of amebiasis among persons coming to the USSR from tropical countries were developed among two groups of patients, one hospitalized or ambulatory patients with symptoms of amebiasis and healthy people. Examination of 109 persons coming to the USSR from tropical countries and having clinical symptoms of amebiasis revealed four patients with amebiasis of the liver and seven with amebiasis of the intestines. A total of 3.6 percent of 334 essentially healthy people coming from the tropics showed the presence of Entamoeba histolytica strain of amebiasis. Native residents of endemic zones showed a higher degree of infection with amebiasis and the level of antiameba antibodies was higher in them than among Soviet citizens temporarily visiting the tropics. References 21: 10 Russian, 3 Polish, 8 Western.  
[361-6521]

UDC 612.143-053.6(470-25)"1977-1980"

THREE YEAR DYNAMICS OF ARTERIAL PRESSURE AMONG ADOLESCENTS OF MOSCOW RAYON

Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 53, No 5, May 81 (manuscript received 23 Oct 80) pp 74-78

SHAMARIN, V. M., ALEKSANDROV, A. A., GLAZUNOV, I. S. and ANTONOVA, L. T., All-Union Cardiological Scientific Center, USSR Academy of Medical Sciences; Institute of Child and Adolescent Hygiene, USSR Ministry of Health, Moscow

[Abstract] The dynamics of arterial pressure and its relationship to some indicators of development were studied in different age groups of adolescents



and the possibilities of nonmedicinal effect on the dynamics were studied among children having initially-high levels of arterial pressure. The test group included 242 adolescents with elevated arterial pressure and a control group of 230 adolescents with initially-normal arterial pressure, with each group being followed up over a period of three years. The study revealed a clear trend toward an increase of both systolic and diastolic pressure. The main group of adolescents with initially high arterial pressure showed a tendency to remain in the 5 percent range of higher levels more frequently than occurred among the control group of adolescents with initially lower arterial pressure. Systolic pressure in boys and diastolic pressure in both boys and girls showed a tendency to increase with age. One year of nonmedicinal preventive treatment resulted in a decrease of both systolic and diastolic pressure in the main group. Figures 1; references 9: 3 Russian, 6 Western.  
[367-6521]

UDC 616.24-036.12-058-07

#### EFFECT OF SOCIAL AND HYGIENIC FACTORS ON INCIDENCE OF RESPIRATORY DISEASE

Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 53, No 5, May 81  
(manuscript received 30 Jun 80) pp 98-101

KLEYNER, A. I., YEFREMOVA, V. A., KOPILOVICH, L. Ye., KHIZHNYAKOVA, L. N., SONKIN, I. S., SHEYNIN, B. Ya., TIMCHENKO, A. N. and SMOL'NIKOVA, L. S., Khar'kov Scientific Research Institute of Labor Hygiene and Occupational Diseases

[Abstract] The incidence of chronic nonspecific lung diseases among engineering workers was studied to determine the effect of social and hygienic factors in the incidence of respiratory diseases. A total of 1,255 subjects was examined and the incidence of disease associated with temporary loss of efficiency was analyzed in 4,000 subjects. The mass examinations and sick rate with loss of work efficiency showed relatively widespread distribution of chronic nonspecific lung diseases. Statistical analysis showed a relationship between the combined effect of unfavorable working conditions and nonoccupational factors such as smoking, bronchial infections and so on. It was recommended that working conditions be improved and the quality of periodic medical examinations and hospitalization of patients with initial forms of respiratory diseases be increased to prevent chronic incidence of lung diseases. References 8 (Russian).  
[367-6521]

## NEW CITIES FOR BAYKAL-AMUR MAINLINE RAILROAD

Moscow ZDOROV'YE in Russian No 4, Apr 81 pp 10-11

SUKHANOV, N. V., deputy chairman of RSFSR Gosstroy and chief BAM architect

[Abstract] The problems associated with building new cities along the BAM route are discussed with respect to climatic conditions, accessibility and possibilities for development. A total of 59 cities, town type settlements and small station villages are scheduled for construction along the route of the railroad. In addition to builders from the Main Administration for BAM Construction, collectives from all the union republics and 29 krais, oblasts and autonomous republics of the RSFSR will participate in construction of the cities and towns. The main construction problems are seen as erecting multistory buildings and long sewage lines suitable for many years of operation. The housing constructed along the railroad route will be built with due regard for the local climate. The multistory apartment buildings are designed to have hot and cold running water, elevators, garbage chutes and telephones. Residents of station villages in Khabarovskiy Kray and the Amurskaya and other oblasts will have plots allocated for gardens, domestic cattle and poultry as well as subsidiary farming. Conservation of nature and of natural resources will be one of the high points in construction of the cities. Trees and other greenery will be preserved to the extent possible in cities and all construction will be carried out as dictated by specific local conditions. Figures 1. [345-6521]

UDC 613.84-055.1+613.84-055.2]-053

## SMOKING AMONG MALES AND FEMALES OF DIFFERENT AGE GROUPS

Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 53, No 2, Feb 81  
(manuscript received 13 Feb 80) pp 111-115

OLEYNIKOV, S. P., GLAZUNOV, I. S. and CHAZOVA, L. V., All-Union  
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[Abstract] Frequency of smoking was studied among different age and sexual groups of the population with respect to its effects on risk development factors, various types of cancer and other diseases. Three random samples were taken to determine the distribution of smoking and the attitudes toward the habit among males and females beginning at 16 years of age. The unit for the sample was apartments in an area served by two rayon polyclinics of Moscow. A questionnaire was mailed out to 600, 500 and 500 apartments for the three samples, with postpaid return envelopes. The questionnaire included information on the name of the smoker, year of birth, whether presently smoking or not, whether the person smoked in the past, how many cigarettes smoked per day or were smoked in the past, the

year smoking began, the year the person stopped smoking if no longer smoking, whether the person considers smoking harmful to his health and whether the person wished to quit smoking. Smoking was most prevalent among males in the 20-29 and 30-39 age group and among females in the same age group, comprising 60.4-62.6 and 16.8-19 percent, respectively. Among previous smokers who had stopped smoking, there were more males than females in all age groups and the highest percentage was 55.1 percent among males 70 and older, while the highest percentage among females was 8.6 percent in the 30-39 age group. A total of 83.7 percent of all age groups among males considered smoking harmful while a total of 77.7 percent of females considered the habit harmful. Of all age groups studied, 70.0 percent of males and 69.6 percent of females wished that they could stop smoking. Both males and females in the age group 40-49 years had the highest intake of tobacco, averaging 18.1 cigarettes per male and 14.7 cigarettes per female daily. Standard methods of implementing antismoking programs must be used to disseminate information about the harmful effects of smoking among the population. Figures 3; references 9: 5 Russian, 4 Western. [340-6521]

UDC: 614.:1

#### SOCIOMEDICAL ASPECTS OF AGING

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 9, Sep 81  
(manuscript received 10 Feb 81) pp 29-31

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[Abstract] A study was pursued in a rural area of Moldavia to determine the status of retired people. About 32% continued in their former work for 5-7 years after their pensions started. Causes of retirement included poor health (60%), family circumstances (20%), dissatisfaction with working conditions (10%), and others. A survey of people of preretirement age revealed that only 15% did not wish to continue working after being eligible for a pension. Poor health was the reason for discontinuing work in 70.9% of the pensioners. A breakdown is offered of incidence of diverse pathology among people over 60 years of age (general medical problems 23.6%, urological 16.4%, surgical 14.8%). A discrepancy was found between choice of medical hospital department made and actual category of pathology among the elderly in 30 to 54% of the cases. Systems analysis is helpful in improving highly qualified geriatric care, and the health care system must provide for constant evaluation of its quality so that necessary changes and corrections could be made on an ongoing basis. Reference 1 (Russian). [74-10,657]

UDC 616.98:578.832.1]-084.47:65.012.2

EXPERIENCE IN PLANNING SEQUENCE OF IMMUNIZING WORKING POPULATION WITH  
INACTIVATED INFLUENZA VACCINE

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 11, Nov 81  
(manuscript received 4 May 81) pp 24-28

[Article by I. G. Marinich, Yu. G. Ivannikov, V. A. Kondrat'yev, N. B. Golubkova,  
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Influenza, USSR Ministry of Health; and Petrogradskiy Rayon Sanitary  
Epidemiological Station, Leningrad]

[Text] In organizational respects mass immunization of the working population against influenza with inactivated influenza vaccine is an extremely complex and intricate program that must be completed within limited time. Many organizations, institutions and workers must participate in the preparation and implementation of this program. Mass immunization is planned and conducted in the practical public health conditions characteristic of Leningrad in compliance with the "Mandatory Conditions of Organizing Immunization With Inactive Vaccine at Industrial Enterprises of Leningrad," written by the Leningrad City Sanepid Station. However because of unforeseen organizational problems certain details of the vaccination plan must be corrected in different stages of the work.

The objective of our study was to develop a standard schedule for immunizing industrial workers by applying network planning methods to a rayon in a large city. The work was done in Leningrad's Petrogradskiy Rayon, in which about 40,000-50,000 persons working at 18-28 enterprises were vaccinated each year in fall 1977, 1978 and 1979. The number of immunizations planned at each enterprise varied from 1,000 to 5,000 persons.

The experience of implementing these programs in Leningrad in 1977, 1978 and 1979 was used as the basis for evaluating, by means of expert assessments and by time-and-motion studies, the list of jobs, their sequence, the time spent on them and the labor productivity of a single vaccination team on a daily basis. The network schedule was calculated using the general methods of the network planning theory.\* We calculated the total time of the entire vaccination program, the calendar interval between the start and end of each type of job and the time reserves available for making preparations at each enterprise. Moreover we determined the critical path of the network schedule--that is, we revealed those jobs which, if not performed on time, would cause a delay in the entire program. We adopted 1 November of the current year--that is, a date 1 month prior to the hypothetical time of development of an epidemic--as the program deadline.

\*Zaydenman, I. A., and Margulis, A. Ya., "Matematika v setevom planirovanii" [Mathematics in Network Planning], Moscow, 1967.



Table 1 shows a typical network planning schedule for vaccinations, in which all types of jobs are divided into four groups. Group 1 (No 1-5) includes jobs in the preparatory stage performed at the rayon public health division and the rayon epidemiological station. Group 2 contains preparatory jobs performed right at the enterprises (No 6-18). These jobs are organized by executives of the enterprises and the local public health units. To ensure an optimum flow of vaccinated individuals, rooms with individual entrances and exits are selected depending on the particular locations of different shops; an immunization schedule broken down in relation to different shops is written out and then published in an enterprise order; shop chiefs are made responsible for seeing that their personnel are vaccinated. They see that the list of workers are drawn up with the assistance of timekeepers and orderlies, and they submit these lists to the public health unit, which determines the individuals for whom vaccination is contraindicated. The lists are returned to the shops with the names of persons excused for medical reasons marked. These lists are used to fill out individual appointment cards with which the workers must appear for immunization at the appointed time. Following publication of orders written by the public health units, a number of other measures are implemented: Medical personnel are instructed on the organization and conduct of the immunizations, a shock treatment team is created, briefed and equipped, and public health information is provided. The proposed vaccination traffic pattern is organized in the shops beforehand with the help of directional signs. Teams of orderlies and personnel from the public health unit are formed to provide assistance to the vaccinators. The team members keep order during vaccination, they prepare the area of skin in which the vaccine is to be injected, they enter the vaccination date on the individual appointment cards and compare the date with the lists.

Group 3 (No 19-45) includes jobs associated with vaccination at enterprises requiring two teams of vaccinators, with each team consisting of three physicians. These enterprises are broken down into groups in such a way that the total vaccination time would be the same for both teams. Group 4 jobs (No 46-48) are associated with finishing off the vaccination program and writing up the report.

Table 1. Rayon 1980 Vaccination Network Planning Schedule

Job No.	Job	No. of Pre-ceding Job	Probable Duration, Days	Completion Date
At the rayon level:				
1	Preparation and adoption of the decision for immunization by the rayon executive committee		12	8-25 Aug
2	Creation of the immunization schedule and coordination of jobs with the enterprise management	1	6	26 Aug-2 Sep
3	Preparation and publication of the immunization order by the rayon public health division	2	4	3-8 Sep
4	Meeting with rayon medical personnel on organizing and performing the vaccinations	3	3	9-11 Sep

5	Conference with enterprise executives on organization of the immunizations	4	6	12-19 Sep
At the enterprise:				
6	Selection of the room for immunizations	5	1	22 Sep
7	Development of the immunization schedule for different shops, and its approval	5	2	22-23 Sep
8	Preparation and publication of the vaccination order	6,7	2	24-25 Sep
9	Briefings for medical personnel of public health units and centers on organizing and conducting the immunizations	8	1	26 Sep
10	Compilation of the lists of workers (in different shops)	8	2	26-29 Sep
11	Determination of the proposed traffic pattern for immunizations	8	2	26-29 Sep
12	Creation and briefing of the shock treatment team	8	1	26 Sep
13	Public health information (plant radio broadcasts, lectures, discussions in the shops)	8	3	26-30 Sep
14	Formation of teams to assist vaccinators	8	1	26 Sep
15	Provision of shock treatment gear to teams	12	2	29-30 Sep
16	Determination of persons with contra-indications to vaccination at public health units and centers	10	2	30 Sep-1 Oct
17	Filling out individual immunization appointment cards	16	2	2-3 Oct
18	Completion of preparatory jobs at the enterprises	9,11 13,14 15,16	0	

Vaccination:

19	Enterprise No 13 (4,500 persons)	18	3	6-9 Oct
20	Enterprise No 1 (2,400 persons)	18,19	1	10 Oct
21	Enterprise No 3 (1,800 persons)	18,20	1	13 Oct
22	Enterprise No 5 (1,550 persons)	18,21	1	14 Oct
23	Enterprise No 8 (1,000 persons)	18,22	1	15 Oct
24	Enterprise No 10 (2,000 persons)	18,23	1	16 Oct
25	Enterprise No 12 (1,800 persons)	18,24	1	17 Oct
26	Enterprise No 15 (3,000 persons)	18,25	1	20 Oct
27	Enterprise No 17 (4,200 persons)	18,26	1	21 Oct
28	Enterprise No 20 (750 persons)	18,27	1	22 Oct
29	Enterprise No 22 (700 persons)	18,28	1	23 Oct
30	Enterprise No 24 (700 persons)	18,29	1	24 Oct
31	Enterprise No 26 (700 persons)	18,30	1	27 Oct
32	Enterprise No 19 (750 persons)	18	2	6-8 Oct

33	Enterprise No 2 (2,000 persons)	18,32	1	9 Oct
34	Enterprise No 4 (2,100 persons)	18,33	1	10 Oct
35	Enterprise No 6, 7 (3,500 persons)	18,34	1	13 Oct
36	Enterprise No 9 (1,400 persons)	18,35	1	14 Oct
37	Enterprise No 11 (1,500 persons)	18,36	1	15 Oct
38	Enterprise No 14 (2,200 persons)	18,37	1	16 Oct
39	Enterprise No 16 (3,000 persons)	18,38	1	17 Oct
40	Enterprise No 18 (2,000 persons)	18,39	1	20 Oct
41	Enterprise No 21 (600 persons)	18,40	1	21 Oct
42	Enterprise No 23 (1,000 persons)	18,41	1	22 Oct
43	Enterprise No 25 (900 persons)	18,42	1	23 Oct
44	Enterprise No 27 (700 persons)	18,43	1	24 Oct
45	Enterprise No 28 (650 persons)	18,44	1	27 Oct
46	Work report of team 1	31	1	28 Oct
47	Work report of team 2	45	1	28 Oct
48	Report stating completion of work in the rayon	46,47	3	29-31 Oct

Note: The third column shows the numbers of jobs which must be finished before the particular job could be started.

Calculation of the network schedule revealed that the entire vaccination program would take 60 working days.

Preparatory measures at the rayon level make up the most important and laborious stage; from 3 to 12 working days are required for preparation and performance of the individual jobs in this stage; the preparatory period at the rayon level of public health takes a total of 31 working days according to probability estimates. All of these jobs are on the critical path, and they offer no reserve time. The preparatory jobs performed at the enterprises are standard for all enterprises, and each job takes from 1 to 3 working days. Inasmuch as some of these jobs are performed in parallel, the entire preparatory period at a single enterprise takes 10 working days. The critical path of preparatory jobs at each concrete enterprise includes development and approval of the immunization schedule for the different shops, preparation and publication of the vaccination order, compilation of the lists of persons to be immunized, determination of persons in relation to whom vaccination is contraindicated, and filling out the individual appointment cards. This pertains primarily to enterprises that are to undergo vaccination first. They are obligated to finish all preparatory jobs by the appointed deadline, inasmuch as a delay would mean postponement of the next vaccination stage. On the other hand immunization is performed at the enterprises by the vaccination teams successively, as a result of which most enterprises have extra time for their preparatory stage (Table 2).

The most important phase of the work is vaccination itself. Usually when the preparatory jobs are performed well, a team of vaccinators can immunize 1,000-1,500 persons in an hour. However, it also takes time to deliver the equipment and materials, to locate and prepare the equipment, and to organize the time of arrival at the immunization center. Therefore an enterprise having from 650 to 3,000 persons needing immunizations would need 1 day as a rule. According to the estimates it takes 15 working days to complete this phase. It is also on the critical path, with no extra time available in this stage. A delay in immunizations at any one of the enterprises would cause a disruption in the vaccination schedule at other enterprises.

Table 2. Time Reserves for Preparatory Measures at Individual Enterprises in the Rayon

<u>Enterprise No.</u>	<u>No. of Days</u>	<u>Enterprise No.</u>	<u>No. of Days</u>
13	-	12	8
19	-	16	8
2	2	15	9
1	3	18	9
4	3	17	10
3	4	21	10
6,7	4	20	11
5	5	23	11
9	5	22	12
8	6	25	12
11	6	24	13
10	7	27	13
		26	14
		28	14

After the vaccinations are completed, each team is given 1 day to write up brief reports on the work results. Three days are allocated to the rayon epidemiological station to summarize these reports and submit the final version to the city sanepid station.

Calculation of a network schedule for influenza immunizations at the rayon level showed that the critical path of this schedule includes all of the preparatory jobs at the rayon level, the preparatory jobs performed by enterprises at which vaccinations are to be performed first, the vaccination period and the concluding jobs. The network schedule permitted the rayon sanepid stations to maintain efficient control over the course and succession of the jobs, over their prompt fulfillment by individual executors in each phase, and over fulfillment of the entire complex of jobs by concretely determined deadlines. The experience of using network planning based on real evaluations of a program conducted in the rayon of a large city may be used for immunization of the population by killed influenza vaccines, after the calendar dates are adjusted for the concrete year.

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## PHARMACEUTICAL INDUSTRY IN AFGHANISTAN

Kiev FARMATSEVITYCHNYY ZHURNAL in Ukrainian No 5, Sep-Oct 81 (manuscript received 23 Jul 81) pp 70-74

[Article by B. P. Kryshchtopa, UkSSR Ministry of Health and A. L. Boyko, Pharmaceutical Department of the Kiev gorispolkom: "Medical Assistance to the Population of Afghanistan"]

[Text] During the prerevolutionary period, medical protection in Afghanistan was limited to capitalist enterprise. Along with the state system for supplying drugs, which was formed from the Avicenna Institute, the central pharmaceutical warehouse in Kabul, the quality control laboratories for drugs, biological preparations and narcotics at the Institute of Public Health and the 18 state pharmacies—all of which are under the Ministry of Public Health (MPH)—private enterprise in drugs, which has been retained up to the present, has been widely developed. Numerous drug wholesalers, who in the past imported predominantly expensive remedies, are engaged in it.

In fact, medical service in the country as a whole was concentrated in the hands of private entrepreneurs. The private pharmacy became the basic type of pharmaceutical establishment in Afghanistan.

On the eve of the April Revolution (1978), the state pharmacies in Afghanistan represented only 4.1 percent of the total number of pharmacies and were found in only 11 out of 27 provinces. There were 20,200 inhabitants to each pharmacy, including 20,800 per private pharmacy and 725,100 per state—or 34.5-fold more. The number of inhabitants served by one pharmacy fluctuated from 11,200 in Kabul to 169,000 in some provinces.

Drugs were sold primarily in the cities; however, the rural population, which represented a preponderant number of the country's inhabitants, actually was deprived of medical aid. This resulted in widespread development of uncontrolled traffic in different traditional medicinals of folk medicine. "Drugs" of private manufacture and dubious quality are sold in market places, in the so-called "bazaar pharmacies". According to the incomplete data of the Democratic Republic of Afghanistan (DRA) MPH, there were more than 6,000 such trading centers in the country. The pharmacies of Afghanistan have the right to sell only off-the-shelf medicines. There is absolutely no on-site compounding of prescriptions, no dressings, sanitation and hygiene products, or patient care aids in the pharmacies.

During the prerevolutionary period the Afghan pharmaceutical industry was represented by individual enterprises, chiefly the Hoechst pharmaceutical plant (Kabul) with mixed Afghan-West German capital, which manufactured more than 130 types of ready made medicines under its own licenses and the licenses of other pharmaceutical firms. The entire production of the plant went to meet Afghanistan's needs.

Among the national Afghan pharmaceutical enterprises which manufacture off-the-shelf medicinals are: a small private pharmaceutical laboratory, Saddik; a state enterprise at the Avicenna Pharmaceutical Institute, the Laboratory for the Manufacture of Solutions for Parenteral Administration at Kabul University Medical School and also the Vaccine and Serum Center. These enterprises manufactured only about 30 percent of the necessary quantity of medicines in limited variety. Thus, for example, the enterprise of the Avicenna Pharmaceutical Institute, which is equipped with only four rotation machines of an old English model, manufactured somewhat more than 40 types of medicines, mainly acetylsalicylic acid, calcium, phenacetin and vitamin preparations, some types of alcohols and capsules. Raw materials for manufacturing tablet remedies were purchased in other countries.

A certain amount of drugs which were supplied to patients without charge entered Afghanistan in the form of free aid by international organizations (WHO, UNICEF, YuNDP [expansion unknown]) and other countries for the implementation of programs for control of different diseases (malaria, tuberculosis, leishmaniosis, trachoma).

Owing to the underdeveloped national pharmaceutical industry, the country's requirement for medicines was met basically through importation of over 400 types of manufactured preparations of nearly 60 chemico-pharmaceutical groups, more than 80 percent of these imports falling to the share of the drug wholesalers. The Avicenna Pharmaceutical Institute, which fulfilled basic functions in purchasing drugs (chiefly in the socialist countries) and supplying them mainly to medical institutions and state pharmacies, had only 20 percent of imports.

Despite the fact that in the last 30 years total imports of medicines to Afghanistan trebled, it did not meet its basic health protection requirements. According to the data of the specialists of the International Organization for Industrial Development (UNIDO, 1979), in all 6.8 percent of the annual national income was spent on health protection in Afghanistan, 37 percent of it on the purchase of drugs, the sums spent for this purpose significantly exceeding the resources of the total health protection budget.\*

According to the UNIDO specialists' data, despite the great expenditures involved in purchasing expensive preparations, the per capita consumption of medicines, especially that of the rural population, remained too low. This was a serious obstacle to solving the health protection problems of the Afghan population.

Nonetheless, medical aid in prerevolutionary Afghanistan, which was based chiefly on the principles of enrichment of private individuals, was one of the underdeveloped fields of the state health protection system. There was also no central organ for administering the pharmaceutical service.

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\* Footnote: Development of the Pharmaceutical Industry in Afghanistan. UNIDO, 25 June 1979, p 18.

In accordance with the longterm national policy in the field of drug supply, which is focused on achieving the fullest satisfaction of this population's needs for quality preparations at the lowest possible cost, during the post revolutionary period the government is taking measures to organize and improve the state system of medical aid. The central organ which implements this policy and plans the development of the pharmaceutical service and industry in the country was first created in 1979 within the DRA MPH Department of Pharmaceutics.

One of the basic measures of the postrevolutionary period in the field of improvement of medical service is the policy of expanding the system of state pharmacies and pharmaceutical centers for the sale of drugs, especially in rural areas. Two paths have been contemplated in this direction: constructing state pharmacies from development budget funds and opening them in basic medical centers. The second of them is now the more promising, because it makes it possible to increase the system of state pharmaceutical establishments significantly in a short period without substantial material outlays. The creation of drug sale centers involves organizing them primarily in existing and opening subcenters of health and medical institutions in the cities. The number of state pharmacies and the pharmacies in basic medical centers are expected to increase 2.1 to 2.3-fold in 1980-1984. Nonetheless, despite the measures planned by the First Five-Year Plan for development of public health more than 500 private pharmacies will still be operating in the country by the end of the indicated period.

At the first conference of medical workers of the DRA (1980), it was noted that supplying the population with effective and inexpensive medical preparations has a special place in the improvement of medical service.\*

Taking the path of expanding the availability of medical care, in 1979-1980 the DRA government took measures to establish uniform, stable prices for drugs and reduce them by 75 percent in state pharmacies and 20 percent in private pharmacies. The variety of drugs distributed without charge to in-patients—who are also treated free of charge—was also expanded. The output of the products of the Avicenna Pharmaceutical Institute and the Vaccine and Serum Institute was also increased.

The state monopolized the purchase of basic medicines (antibiotics, etc.) abroad and their distribution in the country. Special attention was given to expanding the introduction to medical practice and to the market of medicinals on the international unpatented products list (generic preparations). This is conducive to significant reduction of drug prices and expansion of availability to the population. In accordance with a law enacted in the DRA in 1979 with respect to generic type preparations, maximum reduction in imports of expensive patented preparations is planned. This law—one of the achievements of the April revolution—enters into full effect in 1982, after which importation of such preparations will be prohibited.

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\* Footnote: Materialy z'yizdu medychykh pratsivnykiv Demokratichnoy Respubliki Afghanistan [Materials of the Conference of Medical Workers of the DRA], (Russian language verbatim account), Kabul, 1980, p 15.



Afghanistan is the only country in the region where only generic preparations will be used. They will be imported from a number of countries including the Soviet Union and the Countries of the Socialist compact.

Special attention is being given to the creation and development of the Afghan state pharmaceutical industry, which is reflected in the DRA's economic and social development plan for 1988-1989, and also in the UNIDO experts' recommendations for its gradual organization. Here the plan is primarily to implement gradual reduction of homemade production of drugs by building modern pharmaceutical enterprises, especially a state pharmaceutical plant for the manufacture of generic preparations (tablets, capsules, ointments, syrups) with the aid of UNIDO, IROON [expansion unknown] (UN East Mediterranean Region Organization) and UNICEF (UN Children's Fund). In the opinion of UNIDO specialists, creation of such an enterprise will make it possible to reduce considerably outlays of foreign currency for drug purchases and to increase the output of drugs of local manufacture more than three-fold.

The Vaccine and Serum Institute, which was built in Kabul with the technical and economic cooperation of France and provided with industrial equipment with the help of the USSR, has become the largest institution of its type in the East Mediterranean region. The output of the products manufactured by it not only meets Afghanistan's needs but also makes it possible to export vaccines and sera to other countries of the region.

The creation of pharmaceutical enterprises for processing medicinal plant material is very promising for Afghanistan.

Afghanistan has long been famous for the presence of many medicinal plants which are found on almost the entire territory of the country. In the places where different types of medicinal plants grow they are widely used by the population, who are deprived of the opportunity to obtain other medical remedies. Without any special processing and on the sole basis of the experience of folk medicine, the local population uses medicinal plants for a number of diseases. These are, for example, plants such as the fruit of the dog rose and sea buckthorn (vitamin-rich); oak, geranium, snake weed (antidiarrhetics); corn, barberry and immortelle (chologogues); plantain, flax, Artemisia (anthelmintics); nettle, snake weed, (grytsyky) (antihemorrhagic in internal hemorrhages); yellow horsetail (diuretics); madder (Rubia tinctorum) (for treatment of urinary calculus); plants which promote wound healing and have bactericidal action--aloe, juniper, eucalyptus, Calendula, St John's Wort, bur marigold; antiasthmatics--Datura; mild sedatives--Leonorus; expectorants--rhubarb, coltsfoot; aromatic plants--mint, cedar, eucalyptus, fennel, anise, coriander, etc.

The first attempt to study the medicinal plants of Afghanistan dates back to the beginning of the 19th century and is connected with the name of the Afghan scientist (Aydgina); during the 1960's this work was continued by (Matta). Medicinal plants were also studied by an expedition from Western countries, however, the botanical material collected by them over many years was taken from Afghanistan in 1973 and lost to Afghan science.



Of great value today is the systematization of medicinal plants produced as the result of an investigation conducted in 1974 by a group of scientists from Moscow State University. On the basis of study of the flora of many regions of the country, they set up for the first time an herbarium containing more than 750 species of medicinal plants of Afghanistan.

The Ministry of Public Health, the structure of which lacked a central organ for management of the pharmaceutical service before the Revolution, was not engaged in the study and preparation of medicinal plants. Proper organization of study of the country's medicinal plants was not provided, and the Division of Medical and Industrial Plants of Afghanistan, in the Department of Logging and Nature Study of the Ministry of Agriculture, was created only in 1975. Consequently, at the present day the country has no complete list of medicinal plants, their scientific types, description of their medicinal and industrial properties and the diseases in which they are employed, the form and methods of use. Not a single reference book has been published on Afghan medicinal plants.

Meanwhile in the specialists' analysis, the country has considerable potential resources both for increasing collection and exportation of the traditional medicinal plants used in modern medicine and for cultivation of many new species.

The DRA government is displaying particular interest in further study of medicinal plants and organization of their processing in order to develop the national pharmaceutical industry. The government's attention to these issues is also indicated by its request to the UN Committee for Narcotics Control to aid the DRA in organizing the production of raw material for opium under government control as one of the possible species for export. Trees and bushes which grow in some provinces and are suitable for extraction of industrial and medicinal oils may also become an export commodity.

In 1978 a group of UNIDO specialists worked in Afghanistan at the government's request. They studied the feasibility of organizing industrial processing of medicinal plants in the country. Their recommendations, as well as findings of Soviet specialists made in 1974, are based on promising plans for construction of a plant for processing medicinal plant material with an experimental base for growing medicinal plants.

The commissioning of new pharmaceutical enterprises will make it possible to increase the output of drugs during the coming decade more than 50-fold over 1977-1978.

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At the same time, expanded importation of drugs is planned, basically from the socialist countries. This objective is promoted by the national leadership's policy of developing in all ways possible commercial and economic relations with the socialist countries, primarily with the USSR and the government's measures for strengthening the state sector's role in the national economy.

Analysis of 1980 imports indicates that the capitalist countries are continuing a policy directed at terminating trade in drugs from the DRA. The reasons for this are primarily opposition to the new regime of Democratic Afghanistan and the unwillingness of the Western firms to supply the country with cheap generic-type medicines.

The basic direction in the organization of medical aid in the DRA under the new conditions is building it up on the basis of bringing the pharmaceutical institutions as close as possible to the population and the medical institutions. This is becoming possible through implementation of planned development of the system of pharmaceutical institutions, enterprises for manufacturing therapeutic, prophylactic and diagnostic agents, state regulation of their output, subsequent introduction of free medical aid in in-patient care, gradual price reduction and expansion of medical care without charge or at reduced rates, primarily at the polyclinics.

An important stage in building up the state system of pharmaceutical service will be its construction on the administrative principal. As this takes place, it will be possible to form a system for regulating and managing pharmaceuticals in the country. Today, when the system of state pharmacies is insignificant, centralized control of them by the Department of Pharmacy of the DRA MPH is justified. As it is created, however, especially at the basic medical centers, it becomes necessary to form central pharmacies in the provinces and confer on them full administrative functions and the responsibility for supplying drugs to the population and the medical institutions located within the sphere of activity of the pharmaceutical institutions.

Expansion of the system of state pharmacies and creation of pharmaceutical industry enterprises requires an increase in the number of personnel, especially pharmacists, and a new approach to the quality of their training. Today the staff of pharmacies is small. One to two persons work in each private pharmacy, predominantly merchants who have practical experience in working with drugs and are called masters of pharmacy.

During the 1978-1984 period the number of pharmacists is expected to increase from 187 to 622, or 3.3-fold. The Kabul University plans to offer a specialization for future pharmacists with organization of a pharmaceutical service, industrial equipment for the manufacture of drugs and analysis of the activity of the pharmaceutical industry, and a specialization in the field of medicinal plants.

Preparation of previously nonexistent national legislation and also publication of an Afghan national record book, which is necessary for workers in practical health protection, will become important.

Thus, the April revolution has created all prerequisites for development of the pharmaceutical service, organization of national enterprises for the manufacture of drugs, formation of a state system of medical care to the population from high-quality new beginnings. Implementation of the plans outlined will take place as conditions in the country stabilize and in association with socioeconomic changes.

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CSO: 1811/16

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HETEROGENEOUS E. COLI ANTIGENS SIMILAR TO HUMAN SPERMATOZOAN ANTIGENS

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian  
Vol 92, No 9, Sep 81 (manuscript received 5 Feb 81) pp 316-317

POPIVANOV, R. P., ZHUKOV-VEREZHNIKOV, N. N. [deceased], BULANOV, I. D.,  
PODOPLELOV, I. I., MISHCHENKO, B. A., NAKOV, L. S., ZHIVKOV, S. M.,  
KIROV, K. I. nad SVISHCHEVA, N. M., Scientific Research Laboratory of  
Experimental Immunobiology (headed by Prof N. N. Zhukov-Verezhnikov  
[deceased], academician of the USSR Academy of Medical Sciences), USSR  
Academy of Medical Sciences, Moscow; and Chair of Biology (headed by  
Prof B. A. Botev), Biomedical Institute of the Bulgarian Academy of  
Medicine, Sofia

[Abstract] These studies were motivated by the hypothesis that there may be heterogeneous antigens in human spermatozoa similar to antigens of microflora. Three serotypes of E. coli strains were used in microprecipitation reactions and to test cytotoxic effects of cell antigens on immune lymphocytes, which were obtained from rabbit spleen; rabbit antisera against human spermatozoa and the tested E. coli strains were also used. Immuno-diffusion analysis revealed several antigens in common in two of the E. coli serotypes and in human (group O and A) spermatozoan antigens, in the case of detergent-treated material. Other experimental variants revealed the same results. This was verified in cross experiments with spermatozoa and bacterial precipitate, with rat lymphocytes. These findings suggest an explanation of mechanisms of sterility based on immunological cross-reactions, as well as practical applications in the form of sperm vaccines to control fertility processes in man and animals. Figures 1; references 9: 8 Russian, 1 Western.  
[53-10,657]

## LASER PUNCTURES IN CLINICAL MEDICINE (LITERATURE SURVEY)

Kiev VRACHEBNOYE DELO in Russian No 7, Jul 81  
(manuscript received 1 Apr 81) pp 4-8

SHTEL'MAKH, N. I. and FILIPPOVA, S. M., Chair of Propedeutics of Internal Diseases (headed by Prof N. I. Shtel'makh), Khar'kov Medical Institute

[Abstract] Applications of lasers for punctures in clinical practice are summarized. The main targets are biologically active points (BAP); coherent monochromatic radiation at a wavelength of 632.8 nm from helium-neon lasers is used primarily because of the availability, reliability and simplicity of handling these lasers. Strangely enough, the methodology of laser puncture has not yet been standardized, various authors reporting different duration of treatment, course of therapy and number of targets, as well as combined delivery of lasers to BAP and reflexogenic zones to enhance efficacy of therapy. A survey is made of laser therapy of internal organ pathology, neurological diseases, pathology of the skeletomuscular system, nephropathy of pregnancy, and good responses were reported; all who have used laser punctures reported that they were well tolerated, without pathological changes in the hemopoietic and cardiovascular systems, although in a few cases there could be some weakness, malaise and intensification of pain for 3-4 days after several treatments. This new therapeutic tool is promising, but further studies are needed to learn more about its mechanism of action, determine optimum methods of using laser punctures, and equipment needs to be refined. References 44: 39 Russian, 5 Western. [51-10,657]

UDC: 616-053.2:312.2.001.8

## ORGANIZATIONAL AND METHODOLOGICAL ASPECTS OF LOWERING INFANT MORTALITY IN BELORUSSIAN SSR

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 9, Sep 81  
(manuscript received 7 May 81) pp 38-40

DERYUGINA, M. P. and DENISEVICH, S. I., Belorussian Scientific Research Institute of Mother and Child Care

[Abstract] The Belorussian Scientific Research Institute of Mother and Child Care is making a significant contribution to lowering infant mortality in Belorussia. Its organizational and methodological department studies infant mortality statistics and develops measures to improve them. The institute has proposed methods of studying causes of early neonatal mortality, clinical analysis of causes of fetal and neonate deaths, causes and circumstances of stillbirth, which are used by most public health



agencies and obstetric institutions in Belorussia. There was a higher death rate on Mondays (studies in Minsk, Brestskaya and Minskaya oblast), apparently related to less qualified care on Sundays. There was a relationship between neonate deaths and stage of pregnancy at which the mothers started to be under medical supervision, and the later they did start, the higher the infant death rate. Flaws referable to infant delivery are also listed. Deficient medical care at the prehospital stage is another cause of postnatal mortality. Social, biological and medical factors of neonate mortality of premature infants, such as mothers who were too young or too old, occupation, pathological prior pregnancies, illness of the mothers and pathological current pregnancy, are discussed. At the present time, emphasis is laid on upgrading organization of neonatal medical care, in which committees on different territorial levels should play an important part. Other recommendations are also offered in the area of emergency delivery, infant intensive care, etc.; however, mention is made of the fact that infant mortality has declined in the past 5 years.  
[46-10,657]

UDC 616.99:658.386.3

POSTGRADUATE TRAINING OF PHYSICIANS IN MEDICAL PARASITOLOGY AND TROPICAL MEDICINE AT CENTRAL INSTITUTE FOR ADVANCED TRAINING OF PHYSICIANS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 49, No 6, Nov-Dec 80 (manuscript received 19 Jun 80) pp 72-76

ALEKSEYEVA, M. I., Central Institute for Advanced Training of Physicians, Moscow

[Abstract] The Central Order of Lenin Institute for Advanced Training of Physicians, now celebrating its 50th anniversary, is distinguished by extensive experience in study of tropical diseases. The chair of tropical diseases plays a leading role in training physicians in medical parasitology and tropical diseases. During the period 1961-1975 the chair of tropical diseases was transformed to a multiprofile department in training physicians for the sanitary-epidemiological service, parasitologists and laboratory physicians. The institute has trained physicians in medical parasitology and tropical medicine over a period of 45 years, including 1,011 physicians in malaria treatment, 543 in treatment of helminthic diseases and 1,103 in parasitology for the sanitary-epidemiological service, 75 pediatricians specializing in infectious diseases and 1,161 clinical physicians for the therapeutic network, 739 Soviet physicians and 166 foreign physicians to work abroad and 295 physicians to teach in medical institutes and state health institutes. Periodic visits of physicians to study local diseases, to participate in expeditions and scientific and practical conferences and symposia and foreign visits to study training of physicians in tropical medicine have contributed to the advanced medical training of teachers. References 7 (Russian).  
[361-6521]

## EFFECT OF INTERFERON ON REPARATION OF DAMAGED DNA

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 258, No 5, 1981  
(manuscript received 16 Mar 81) pp 1231-1232

SINEL'SHCHIKOVA, T. A. and ZASUKHINA, G. D., Institute of General Genetics,  
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[Abstract] The effect of interferon on the rate of recovery of breaks induced by a chemical mutagen in the cells of chicken fibroblasts and man was investigated. The DNA breaks were determined in alkali saccharose gradients and by chromatography in columns with benzoylated naphthalated DEAE-cellulose. The interferon was injected into the culture medium 24 hours prior to treating the cells of chicken fibroblasts with 4-nitroquinoline-1-oxide used as the mutagen. The effectiveness of protection by the virus-induced interferon ranged from a low of 7 to a high of 88 percent. The effectiveness of protection by polyI-polyC-induced interferon ranged from 0 to 93 percent. The experiments indicate the existence of sections in the interferon molecule trophic to specific DNA sites with which the 4-nitroquinoline-1-oxide primarily interacts. References 4; 2 Russian, 2 Western.  
[358-6521]

UDC: 616.9-036.21:576.8.095.1

## MODERN POPULATION ECOLOGY AND SCIENCE OF ENDEMICITY OF DISEASES

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 (manuscript received 27 Feb 80) pp 3-11

KORENBERG, E. I., Institute of Epidemiology and Microbiology imeni  
N. F. Gamaleya, Moscow, paper submitted at 10th All-Union Conference on  
Endemicity of Diseases, Dushanbe, 1979

[Abstract] A survey is made of development of research since Ye. N. Pavlovskiy advanced the conception of natural endemicity of diseases about 40 years ago, which emerged as a major biomedical branch of science. It deals also with questions of the epizootic process, population biocenology, population genetics, population ecology, but the survey deals mainly with population genetics as related to epizootic processes, as they relate to the carrier, vector and pathogen aspect, as opposed to the vertebrate, arthropod and microorganism aspect. The distinction between phylogenetic and ontogenetic immunity is pointed out, the former being manifested the most on the level of species. Phylogenetic, or constitutional, immunity is determined by many genes inherited in accordance with Mendelian laws. Ontogenetic immunity is related to individual features of phylogenetic immunity. Vectors are significant for their capacity to

acquire, harbor and transmit pathogens and research has shown that these properties are unstable. There is also discussion of natural variability of pathogens of different groups of diseases, referable to viruses, rickettsia, bacteria, protozoans, related to different environmental factors. Carriers and vectors have selective functions for pathogens, and there are two aspects to this in the author's opinion: 1) dynamics of epizootic process related to heterogeneity of carrier, vector and pathogen populations; 2) significance of joint evolution of parasite-host relations to the form of invasion and biological form of pathogen. References 79: 64 Russian, 15 Western.  
[71-10,657]

UDC: 616.993.162-036.21(517.3)

NEW DATA ON ENDEMIC SITES OF ZOONOTIC CUTANEOUS LEISHMANIASIS IN THE MONGOLIAN PEOPLE'S REPUBLIC

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian Vol 50, No 3, May-Jun 81 (manuscript received 10 Jun 80) pp 11-15

NERONOV, V. M., LUSHCHEKINA, A. A. and GUNIN, P. D., Institute of Evolutionary Morphology and Ecology of Animals (IEMEZh) imeni A. N. Severtsov, USSR Academy of Sciences, Moscow

[Abstract] New data have been collected in a continuation of the 1976-1977 expedition of a Soviet and Mongolian research team, when the first endemic sites of zoonotic cutaneous leishmaniasis (ZCL) were discovered in the central and eastern Gobi region of Mongolia (this expedition was headed by Academician V. Ye. Sokolov in the area of scientific guidance of zoological studies). Here, the results are submitted of field studies pursued in 1978-1980 of the incidence of these sites, and also included the western Gobi region. These expeditions traveled distances of 9500 (1978), 11,500 (1979) and 12,000 km (1980) and the sites examined are illustrated on a map. The findings included 4 species of mosquitoes, *Phlebotomus andrejevi*, *Ph. mongolensis*, *Ph. alexandri* and *Sergentomyia murgabiensis*, the last 2 having been found for the first time in Mongolia, while the first 2 had been shown to be the vectors of *Leishmania major* for great gerbils, causing intensive epizootic outbreaks of the disease. These animals were found to be the chief carriers of *L. major* in several areas. A total of 10,200 specimens of mosquitoes were gathered, and population size, as well as species composition in different sites, were tabulated. The range of the great gerbil was defined and a total of 8 endemic sites was demonstrated in the central Asian part of Mongolia. Figures 1; references 8: 7 Russian, 1 Western.  
[71-10,657]

ROUTES OF HUMAN TICK-BORNE SPIROCHETAL INFECTION IN THE FERGANA VALLEY

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 (manuscript received 5 Sep 80) pp 21-23

ABDULKHASANOV, A. A., Fergana Pedagogic Institute imeni Ulugbek

[Abstract] A study was made of the places where people come in contact with *Alectorobius tholozani papillipes*, which is the vector of the pathogen of rural spirochetosis (farms in villages, field camps and seasonal kolkhoz and sovkhoz buildings, seasonal preschool children's institutions of kolkhozes and sovkhozes, livestock stables of public and state farms), as well as of *Alveonasus canestrini* and *Argas persicus*, which is the carrier of avian spirochetosis pathogen and pathogens of arboviral and rickettsial diseases. More than 600 cases of tick-borne spirochetosis were found in 1951-1978 in the Fergana part of Oshskaya Oblast, the tick invasions being related to industrial and farm work. Farms were found to be the most hazardous places for contracting infection (50% of the cases). In general almost 66% of the spirochetosis cases occurred in the types of buildings most intensively invaded by ticks. It is important for public health and veterinary agencies to be well-informed about the epidemiological situation in order to properly plan and administer preventive measures. References 12 (Russian).  
[71-10,657]

DISCOVERY OF PERSISTENT TULAREMIA MICROSITE WITH *Ixodes redikorzevi* AS MAIN VECTOR IN INTENSIVE AGRICULTURAL REGION OF STAVROPOL'SKIY KRAY

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 (manuscript received 19 Aug 80) pp 23-27

LUKASH, M. M., KALMYKOVA, N. P., MALAKEYEVA, N. M., LISICHENKO, L. N.  
and GLUSHKO, N. V., Budenny Plague-Control Department

[Abstract] On the basis of analysis of prior findings referable to endemic sites of the steppe type of tularemia in Stavropol'skiy Kray, differentiation was made of enzootic regions, and a search pursued for sites with persistent pathogens for the purpose of better implementation of preventive work. A new microsite was discovered in southeastern Stavropol'skiy Kray, in Georgiyevskiy Rayon, as a result of many years of epizootiological studies of this area, which is enzootic for tularemia. The new site is 8-9 km away from the village of Lysogorka, and agriculture is intensive there; the site is adjacent to an embankment of a no longer used railroad track that is heavily covered with bushes and weeds, providing a good breeding ground for rodents. *Fr. tularensis* was first found there in 1972,



when there was also a large population of small rodents, represented by the common vole, house and forest mice, gray hamster, field mouse, white-toothed shrew and European hare. The populations of these animals were counted in different years (1977-1978), and four *Ixodes* tick species were identified: *I. redikorzevi*, *I. laguri*, *Der. marginatus* and *H. punctatus*, as well as 6 flea species (*Ct. wagneri*, *Ct. orientalis*, *Ct. proximus*, *C. mokrzeckyi*, *C. consimilis*, *Lept. taschenbergi*) and 5 species of gamasid ticks (*H. nidi*, *H. glasgowi*, *E. stabularis*, *M. matricus*, *P. necrophori*), from some of which *F. tularensis* was isolated, with *I. redikorzevi* being the main vector for the common vole, house and forest mice, and gray hamster. The microsite is about 1000 hectares in size. References 11 (Russian).  
[71-10,657]

UDC: 578.833.27:578.23/ .24

#### EXPERIMENTAL STUDY OF PERSISTENCE OF TICK-BORNE ENCEPHALITIS VIRUS IN POIKILOTHERM CELL CULTURE

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 (manuscript received 26 Nov 80) pp 27-30

IZOTOV, V. K. and CHUNIKHIN, S. P., Institute of Poliomyelitis and Viral Encephalites, USSR Academy of Medical Sciences, Moscow

[Abstract] A model of chronic TBE [tick-borne encephalitis] virus infection was obtained using strain Yar-74 of TBE virus isolated from *Ixodes persulcatus* ticks in Yaroslavskaya Oblast (in 1974) to infect transferable cultures of XTC [*Xenopus laevis* spur-toed frog cells] obtained from the Yale Arbovirus Research Center (United States) in the 528th passage. TBE virus was passed intracerebrally 6 times in white mice and a virus-containing suspension of neonate mouse brain served as infective material. Persisting virus was titrated for cytopathic activity in test tube cultures of pig embryo kidney cells and by the plaque-production method in these cultures, as well as in infected 2-4-day mice. Different incubation temperatures were used for TBE-infected XTC (10 to 32°C), it being demonstrated that optimum temperatures for XTC were not optimum for TBE virus reproduction (32°C was best for the virus and 10-20°C was associated with minimal reproduction, whereas 28°C is optimum for XTC). Figures 1; references 9: 6 Russian, 3 Western.  
[71-10,657]

USE OF ACARICIDES IN CONTROL OF VECTOR OF TICK-BORNE ENCEPHALITIS VIRUS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 (manuscript received 12 Nov 80) pp 35-43

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Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of  
Medical Sciences, Moscow

[Abstract] A survey is made of advances in control of *Ixodes persulcatus* tayga ticks in sites endemic for TBE [tick-borne encephalitis] using different chemical agents--DDT, and lindane [hexachlorocyclohexane]. Early trials of both agents in 1951-1956 revealed that lindane loses its acaricidal properties within 2 months, while DDT has an effect lasting 2-3 years and in general was more effective (88% eradication with lindane dust versus 98.8% with DDT). Reference is made to the condemnation in the press of many countries of the use of DDT, chiefly by individuals without adequate competence. However, it is argued that, with adherence to the rules and regulations referable to tick control, the main objections to DDT (rapid reappearance of arthropods, development of DDT-resistant strains of vectors, hazard to human health, devastating effect on beneficial fauna, other agents can replace DDT) do not apply for the purpose of eradicating ticks as a specific measure for prevention of TBE. The authors discuss each of the above objections as they apply to tayga ticks specifically. It is concluded that DDT does not present a significant hazard (though it is not entirely safe to all fauna in treated sites); however, it is not necessarily the agent of choice in all areas from the standpoint of epidemiological validation and economy, i.e., in heavily populated regions. Other categories of acaricides (organophosphorus compounds, carbaminic acid derivatives) have also been used, their immediate efficacy is high, but use is advised for only short periods (1-2 months) for immediate protection of people happening on endemic sites for TBE. References 59: 51 Russian, 8 Western.  
[71-10,657]

UDC: 616.981.452-084.449.932-036.8

METHODS FOR ASSESSING RODENT EXTERMINATION AS MEANS OF PREVENTING PLAGUE

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 (manuscript received 28 Mar 80) pp 44-48

SOLDATKIN, I. S. and RUDENCHIK, Yu. V., "Mikrob" All-Union Scientific Research  
Institute for Plague Control, Saratov

[Abstract] A critique is offered of methods used to assess the efficacy of controlling endemic plague sites: possibility of different interpretation

of statistics offered concerning incidence of plague epizootics and extent of control measures; poorly chosen control regions; extermination performed months after outbreaks, which have a natural pattern of rise and decline, appears to have a higher epidemiological effect than in reality; invalidity of concept that eradication of enzootic outbreaks by exterminating carriers is based on constant circulation of plague pathogen in endemic sites. Extermination of rodents is effective in the course of an outbreak, but has the disadvantage of causing temporary increase in infectivity of a site because of intensified migration of fleas to burrow holes in the case of eradication of the great gerbil, which is apparently less relevant for other carriers. There is no available evidence to confirm or deny the possibility of preventing epizootic outbreaks by exterminating rodents ahead of an outbreak, because of the difficulty of forecasting the time and place thereof. However, as a method of early prophylaxis, it should be praised for unquestionably arresting epizootics and having no after-effects. Further research is recommended to determine the expedience of different preventive methods. Figures 3; references 14 (Russian). [71-10,657]

UDC: 576.895.775.095.3

XENOPSYLLA GERBILLI MINAX AND XENOPSYLLA CONFORMIS FLEAS AS POSSIBLE HUMAN PARASITES

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 (manuscript received 15 Jan 80) pp 62-64

MOROZOV, Yu. A. and SAGIMBEKOV, U. A., Chimgent Plague Control Station, Chimgent

[Abstract] Insectarium-reared *Xenopsylla gerbilli minax*, which are intensive ectoparasites of gerbils in Muyunkumy and are considered the vectors of plague in a plague site studied in that region, and *X. conformis* (100 of each species), were used in experiments conducted in May 1979. They fed on white mice at room temperature, and after satiation were put into test tubes with sand and kept there for 10 days at 15-17°C without food, after which they were moved for 24 h to a temperature of 20-25°C, which causes them to be more active. Then batches of 20 fleas were applied to the internal surface of a human subject's arm for 5 min. The behavior of both species on man was the same: very restless for 1 min, hopping about, trying to pierce the skin but moving to another place before starting to suck, then 59 to 73% began to feed, while others continued to search for a "comfortable" place. More *X. g. minax* sucked human blood than *X. conformis*, and females of both species fed more actively. The subjects' reactions consisted of insignificant itching and mild hyperemia of the region of the bite. This means that the fleas can serve as vectors between rodents and man. References 9 (Russian) [71-10,657]

STUDY OF ECTOPARASITES OF RATTUS NORVEGICUS NORVEGICUS BERK. 1769  
GRAY RAT IN NORTHERN KAZAKHSTAN

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 (manuscript received 4 Feb 80) pp 69-74

NECHAYEVA, L. K., KOZLOV, A. N. and ZHOVTTY, I. F., Irkutsk Scientific  
Research Institute of Siberia and the Far East for Plague Control

[Abstract] The gray rat, which is an adventive species in the rodent fauna of northern Kazakhstan, began to settle in that area in connection with the development of virgin lands and influx of people and equipment from other areas starting in 1954. Almost all of this region is now inhabited by this rat, and its ectoparasites must be investigated, since it is a reservoir of many pathogens of human and animal diseases. A total of 2907 gray rats collected from livestock farms were examined for fleas, as well as 20 of their nests, yielding 3312 arthropods: 8 species of fleas, 1 of lice and 16 species of gamasid ticks, which are listed in tables showing distribution in the 6 oblasts of this region, as well as quantity gathered from animals and nests. The most widespread ticks were *Macrocheles matrius* Hull and *Poecilohirus necrophori* Vitzth. The gray rat inflicts great economic losses and is the contact between man and wildlife, so that it is extremely important to continue with studies of its parasites, as well as their epidemiological and epizootiological role in virgin territory undergoing development. References 20 (Russian). [71-10,657]

BIOCHEMICAL FEATURES OF BLOOD-SUCKING IXODOIDEA TICKS WHICH ARE VECTORS OF  
PATHOGENS (LITERATURE SURVEY)

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 (manuscript received 12 Dec 80) pp 74-78

REVINA, T. A., Institute of Epidemiology and Microbiology  
imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Since pathogenic microorganisms invade primarily the intestine of blood-sucking ticks, it is particularly important to know the structure of the intestine and biochemistry of digestion in them, which determine the fate of pathogens. Amino acids, glucose, proteolytic activity, inorganic elements of hemolymph, carbohydrates and proteins contained in tick tissues and fluids were examined at some stages of tick development, but not beyond the third stage, i.e., not over the entire cycle thereof. Studies have also been made of biochemical aspects of interaction between ticks and rickettsia,



which revealed that infection caused changes in levels of arginine, alanine and protein composition of hemolymph. Studies of lipids of hemolymph revealed three categories: fats, phospholipids and sterols. Guanine is the main end metabolic product, proteins and amino acids being also demonstrated in excreta of satiated ticks at a later time. Nucleic acids of ticks have not been investigated. References 35: 8 Russian, 27 Western.  
[71-10,657]

UDC: 576.895.7:378.661

ROLE OF CENTRAL INSTITUTE FOR ADVANCED TRAINING OF PHYSICIANS IN TRAINING MEDICAL ENTOMOLOGISTS IN USSR

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian Vol 50, No 3, May-Jun 81 (manuscript received 30 Dec 80) pp 78-80

ALEKSEYEV, A. N., ZARECHNAYA, S. N. and MAKHAN'KO, Ye. V.

[Abstract] The history of the Central "Order of Lenin" Institute for Advanced Training of Physicians, founded in 1930, is reviewed, with special reference to the department of medical parasitology which trains medical specialists in malaria, helminthologists, medical entomologists and hydraulic engineers. In the past, attention was focused on training personnel for malaria control centers, and after eradication of malaria it shifted to control of vectors of intestinal infections and concern about tick-borne encephalitis. Statistics are offered on number of graduate entomologists in different periods. To broaden enrollment, traveling courses of medical entomology were begun in 1972. In spite of the fact that 1623 entomologists graduated between 1977 and 1981, there is still an acute shortage of such specialists, and to fill this gap it is imperative to establish centers for postgraduate training of medical entomologists in more regions. One step already taken in 1980 is the training in this field of biologists at disinfection stations and disinfection departments.  
[71-10,657]

UDC: 576.895.772.095.38:576.895.42

HORSEFLIES AS HOSTS OF IXODES TICKS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian Vol 50, No 3, May-Jun 81 (manuscript received 30 May 80) pp 80-81

BOSHKO, G. V. and SKLYAR, V. Ye., Institute of Zoology, Ukrainian Academy of Sciences, Kiev, and Poltava Pedagogic Institute

[Abstract] Female Ixodes persulcatus ticks were reported to be found on hungry Tabanus bovinus female horseflies for the first time in 1956 under

laboratory conditions. In 1972 V. Ye. Sklyar discovered a female *Tabanus leleani turkestanicus* Ols. in the vicinity of Ashkhabad, with 2 specimens of another tick species (male and female), *Rhipicephalus turanicus* B. Pom., a subspecies of *Rhipicephalus sanguineus* Latr., which sometimes invades man and can transmit tick typhus. Figures 1; references 3 (Russian). [71-10,657]

UDC: 576.895.421.082.26

#### CULTIVATION OF IXODES PERSULCATUS TICKS IN THE FIELD

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 (manuscript received 12 Mar 80) pp 83-85

ARUMOVA, Ye. A., Institute of Medical Parasitology and Tropical Medicine  
imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] A method was developed to study the biology of *I. persulcatus* in West Sayana at all stages of its development: Up to 10 cylinders were inserted 5-7 cm into the surface cover of a fenced off forest area about 25 sq meters in size. The cylinders, which are about 750 mm in diameter and height, are made of 3 mm iron and were left open on the top so that sunlight, rain, fallen leaves and snow were accessible, but adhesive (such as ED-20 tar) was spread over the top portion of the inside walls to prevent the ticks from crawling out. A card was kept for each container, with a record of the time and number of ticks placed in it and removed. Up to 100 females, 3000 larvae or 500 nymphs can be put in each cylinder, depending on the purpose of the experiment. This is a convenient method for obtaining cultures of *I. persulcatus* with known features, observing their behavior in their natural habitat, and probably it can also be used to breed other similar species of ticks, such as *I. ricinus* and *Haemaphysalis concinnanin*. References 2 (Western). [71-10,657]

UDC: 616.993.161-036.2:061.3(100)"1980"

#### INTERNATIONAL SEMINAR ON EPIDEMIOLOGICAL METHODS OF STUDYING LEISHMANIASIS (MOSCOW--BAKU--SAMARKAND)

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian  
Vol 50, No 3, May-Jun 81 pp 88-89

SAF'YANOVA, V. M. and KUZNETSOV, R. L.

[Abstract] The International Seminar on Epidemiological Methods of Studying Leishmaniasis, funded by WHO, convened in the Soviet Union from

29 May to 19 June 1980, its program conforming to the WHO special program for the study and training of specialists in tropical diseases. There were 25 specialists from 10 countries among the participants, and the seminar was held in Moscow, Baku and Samarkand (with side trips to Sheki, Karshi and Golodnaya Steppe), ending in Moscow. There were three main elements in the seminar: discussion of lectures, copies of which were available to participants in advance; laboratory workshops; field workshops to study methods of investigating leishmaniasis. The laboratory workshops inspired much interest. Representatives of all participating nations (Afghanistan, Bangladesh, India, Iraq, Iran, Pakistan, Syria, USSR, Sudan, Turkey) delivered well-illustrated papers on the scheduled topic and practical implications of the problem. The seminar was extremely well-organized, exceeding the initially planned purely instructive program, thanks to the high qualifications of participants, concern and active involvement in all aspects of the seminar. It was unanimously agreed to publish the material of the seminar as a separate report or collection of papers.

[71-10,657]

UDC: 612.821.6

DEFENSE REACTION OF ONE RAT AS CONDITIONED SIGNAL FOR ADAPTIVE BEHAVIOR  
OF ANOTHER

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 34, No 8, Aug 81  
(manuscript received 31 Dec 80) pp 836-839

SIMONYAN, R. G., GARIBYAN, A. A., GAMBARYAN, M. L. and DZHAMALYAN, G. A.,  
Institute of Radiophysics and Electrophysics, Armenian Academy of Sciences,  
and Institute of Zoology, Armenian Academy of Sciences

[Abstract] Experiments were conducted on 2 rats, 1 each placed in one or the other of two compartments of a chamber separated by a transparent, sound transmitting partition. Electric current could be delivered to the floor of both compartments, only one of which has a pedal that turns it off in both. In preliminary tests, the rat in the compartment with the pedal would eventually find the pedal in its search to avoid electric shock. Then current was delivered only to the compartment without the pedal, where the rat would respond by displaying motor anxiety and squeaking, which would prompt the rat in the other compartment to depress the pedal to spare its partner of pain. If it did not do so, 1-2 s later the second rat would be submitted to current and would then depress the pedal. After 5-6 such tests, the defence reactions of one rat became a conditioned stimulus for the other. The electronic equipment used in these tests is illustrated and described, and its specifications listed. There is also an illustration of the experimental box. Figures 3.

[44-10,657]



FUNCTIONAL STATE OF SOME BRAIN SUBCORTICAL STRUCTURES DURING ADAPTATION AND DEADAPTATION TO EXERCISE

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian  
Vol 92, No 9, Sep 81 (manuscript received 17 Mar 81) pp 271-273

BOYEV, V. M., Orenburg Medical Institute, presented by A. M. Chernukh,  
academician of the USSR Academy of Medical Sciences

[Abstract] Recent demonstration of involvement of subcortical structures in emotional reactions, motor activity and adaptive mechanisms prompted this study of deep structures of the rabbit brain. Experiments were conducted on 35 rabbits conditioned by running in a circular treadmill, first to submaximum intensity and duration and from the 8th to 120th day to maximum levels thereof, with observation for 1 month after such conditioning. This was preceded by implantation of electrodes (bipolar, nichrome) in the dorsal hippocampus, reticular formation, ventromedial nucleus of the hypothalamus, caudate nucleus and anteromedial thalamic nucleus 15-20 days prior to conditioning, to record local cerebral blood flow and for stimulation. The reticular formation and ventromedial nucleus presented increased excitability during the first 10 experimental days; dorsal hippocampus was 25-63% more excitable throughout conditions, anteromedial nucleus and caudate body presented a 33-52 and 75-180%, respectively, decrease in level of excitability. There was relative stabilization of functional activity of all these structures, except the ventromedial nucleus, where it began to increase on the 20th day. There were also typical changes in cerebral blood flow: decline (40th-60th days of running), elevation (gradual up to 120th day) and another decline in the deadaptation period for most structures. Figures 2; references 13: 10 Russian, 3 Western. [53-10,657]

UDC: 616.45-001.1

ACTIVITY OF KREBS CYCLE DEHYDROGENASES AND TISSULAR RESPIRATION ENZYMES IN CEREBRAL HEMISPHERES OF RATS UNDER STRESS

Kiev UKRAINSKIY BIOKHIMICHESKIY ZHURNAL in Russian Vol 53, No 6,  
Nov-Dec 81 (manuscript received 16 Mar 81) pp 40-44

DAVYDOV, V. V., TVERDOKHLIB, V. P. and YAKUSHEV, V. S., Orenburg Medical Institute

[Abstract] Experiments were conducted on 300 Wistar rats, which were divided into 4 groups: intact rats--control, animals submitted to nociceptive and emotional stress, animals with ligated descending branch of the left coronary artery, rats in which myocardial necrosis was produced

24 h after the stress factor. Evaluation of nociceptive stress was made 6 h after the start of the experiment (ulcerative changes in the gastric mucosa, increased weight of adrenals and involution of thymus) and ischemic myocardial necrosis was ascertained by the EKG and postmortem. Mitochondria were removed on the 2d and 7th days of the experiment and activity of succinate dehydrogenase, NAD and NADP-dependent isocitrate dehydrogenases, malate dehydrogenase and cytochrome oxidase was determined, as well as intensity of oxygen uptake by brain sections. Creatine content was assayed in brain extracts. There was decrease in activity of NAD-dependent isocitrate dehydrogenase of mitochondria, as well as malate dehydrogenase at the early stage after nociceptive stress and decrease in succinate dehydrogenase activity at the later stages. The changes were more marked with myocardial necrosis in rats also submitted to stress previously. Oxygen uptake by brain sections decreased after exposure to stress and production of myocardial necrosis. Cytochrome oxidase activity increased, probably as a compensation for diminished oxygen uptake. During development of myocardial necrosis in animals under stress, cytochromoxidase activity dropped. The significance of all these changes to development of neurosis-like states is discussed as a possible pathogenetic factor. Figures 1; references 17: 9 Russian, 8 Western. [62-10,657]

UDC: 612.825

#### MODEL OF 'COMPLEX' RECEPTIVE FIELD OF VISUAL CORTEX NEURON

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 260, No 2, 1981  
(manuscript received 29 Apr 81) pp 505-508

SUPIN, A. Ya., Institute of Evolutionary Morphology and Ecology of Animals imeni A. N. Severtsov, USSR Academy of Sciences, Moscow  
(presented by Academician V. Ye. Sokolov on 13 Apr 81)

[Abstract] Because of the interest in complex detector neurons, as opposed to "simple" neurons, a model is offered for the receptive field of a complex, orientation-selective neuron, which describes many of its properties. The model provides for selectivity to stimulus level due to nonlinearity of spatial summation of excitation in the receptive field; it is based on the hypothesis that inputs from several points of the receptive field in a transverse direction end on the branches of the same dendrite trunk and from those situated in a longitudinal direction end on different trunks. The reaction of a complex neuron is a function of length and width of stimulus. There is an illustration of the latter function in a model with homogeneous receptive field demonstrating that the reaction depends on shape, size and direction, but not position of the stimulus in the receptive field. As compared to a complex receptive field, the homogeneous one is at a maximum in the center of the field and diminishes in accordance with the Gaussian function law as the distance from the center increases. Selectivity

is related to presence of separate excitatory and inhibitory regions in the receptive field. Applications of this model to different versions of simple and complex fields should be explored. Figures 3; references 10: 3 Russian, 7 Western.  
[55A-10,657]

UDC: 612.821.2

#### MODEL OF INFORMATION RECORDING AND RETRIEVAL PROCESSES

Tbilisi SOOBASHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 101, No 3, Mar 81 (manuscript received 11 Jul 80) pp 673-676

NATISHVILI, T. A., Tbilisi State University (presented by Academician T. N. Oniani on 9 Jul 80)

[Abstract] An alternative to traditional models of memory, which are based on experimental psychological or behavioral data, is proposed, which requires less time separation of recording and retrieving a memory trace. A model is illustrated consisting of the following elements: storage of long-term memory traces, unit that compares the input signal to be stored with a trace in long-term memory, so that the comparing unit is an element that both records and retrieves the trace. The mechanics of this process are discussed as they relate to the extreme cases of input of a new signal and of a familiar signal, a copy of which is present in long-term memory. In essence, the recording and retrieving processes are virtually simultaneous and the comparator determines which prevails at a given time. It is suggested that in the recording mode the system forms a neural model of the stimulus and in the retrieval mode it forms a neural model of the reaction, which constitutes a reproduced image of a memory trace, rather than the trace proper. Figures 1; references 5: 2 Russian, 3 Western.  
[48-10,657]

UDC 615.322.017:615.214.3.015.4:612.591.1.053

#### EFFECTS OF PROLONGED INTAKE OF ELEUTEROCOCCUS ON ADAPTATION OF SEAMEN IN TROPICS

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 5, May 81 pp 57-58

BERDYSHEV, V. V., Lieutenant-colonel (retired) of the medical service

[Abstract] The effect of prolonged intake of eleuterococcus in so-called tonic doses on the functional state of the body and the efficiency of seamen was investigated during a voyage in the tropics. The test subjects included 28 male ship personnel who received 2 ml each of an alcohol extract from the roots of eleuterococcus daily for a month from the first day of the voyage.

A control group of 49 seamen of the same specialties received a placebo of an alcohol tincture of tea of the same concentration. Both the eleuterococcus and the placebo were taken after going off watch, during dinner, or before going to bed. The markedness of functional changes during adaptation to tropical conditions and also during watches and working at high temperatures and atmospheric humidity decreased appreciably after prolonged intake of the preparation. Mental and physical efficiency showed indirect improvements, the lability of the visual analyzer increased and the condition of the respiratory system improved. The indicators of nonspecific resistance of the body and less marked tension of cortical function showed a tendency toward stabilization. The test subjects who were administered eleuterococcus over a prolonged period showed lower excretion of vitamin C, total nitrogen, creatinine, sodium and potassium in the urine and perspiration. Administration of eleuterococcus in tonic doses accelerated the adaptation process of most seamen while sailing in the tropics, increased efficiency during watches and contributed to the readaptation process during the period after the voyage. No negative effects of taking eleuterococcus over a prolonged period were apparent. Figures 1.  
[365-6521]

UDC 613.67:612.592.1

#### NATURAL RESISTANCE OF THE BODY DURING HUMAN ADAPTATION IN ARCTIC

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 6, Jun 81 pp 50-52

SAPOV, I. A., laureate of the USSR state prize, professor, major-general in the medical service, NOVIKOV, V. S., candidate of medical sciences, captain medical service, and ARZUMANOV, A. A., captain medical service

[Abstract] The dynamics of natural resistance indicators in healthy people living for a prolonged period in the Arctic was investigated in 348 persons who lived in the region from 1 month to 15 years. Phagocytosis, leucocytosis and the antimicrobial resistance of the skin were studied to characterize natural resistance. The initial reaction of people in unaccustomed climatic and geographic conditions is a marked decrease of physicochemical stability, disturbance of the absorptive function of blood leucocytes, an increase of microbial contamination and a decrease of bacteriocidal activity of the skin. The intensity of leucocytosis subsequently increases and the activity of phagocytosis decreases. The physicochemical resistance of leucocytes decreases by 10.6 percent and the digestive capacity of leucocytes decreases by 53 percent after 6 months in the Arctic. The change in the intensity of phagocytosis during adaptation to Arctic conditions possibly occurs because of the beginning depression of molecular mechanisms that regulate the bacteriocidal properties of the blood neutrophils. Hypersecretion of glucocorticoid hormones during stable stress periods may also inhibit the functions of leucocytes. The sick rate of test subjects increased during the adaptation period, mainly with an increase



of acute respiratory infections. This is seen as the result of a decrease of natural resistance due to suppression of phagocytosis. As the body adapts to stressful conditions, phagocytic activity of leucocytes and indicators of nonspecific natural immunity reach maximum values within 6-12 months and return to normal within 3 years or more. The new level of functioning of nonspecific immunity factors is formulated within 3-4 years in persons who settled in a given region of the Arctic. References 10 (Russian). [343-6521]

UDC: 557.391.547.963.4.472.7

STRUCTURAL ANOMALIES OF CANINE HEMOGLOBIN DUE TO IONIZING RADIATION

Kiev UKRAINSKIY BIOKHMICHESKIY ZHURNAL in Russian Vol 53, No 6,  
Nov-Dec 81 (manuscript received 26 May 80) pp 16-21

SUKHOMLINOV, B. F., SAVICH, A. V., SHAL'NOV, M. I. (deceased),  
STARIKOVICH, L. S., DUDOK, Ye. P. and OLONTSEVA, O. I., L'vov State  
University imeni Ivan Franko; Institute of Biophysics, USSR Ministry  
of Health, Moscow

[Abstract] Experiments were conducted on 10 dogs divided into 2 groups:  
1) 3 dogs exposed to a dose of 4 Gy delivered from an RUM-11 unit; 2) 7  
dogs, 4 of which were not irradiated and 3 exposed to 3.8 Gy  $^{60}\text{Co}$  gamma  
rays (for the first group, hemoglobin taken prior to irradiation served as  
the control). Part of the hemoglobin was changed to the cyanmethemoglobin  
form and used for disk electrophoretic separation and staining of fractions.  
The rest was changed to the CO form, dialyzed and used in a column with KM  
cellulose. Heme was separated from globin and the latter submitted to  
dactylographic analysis. Trypsin was used for hydrolysis. Histidine- and  
tyrosine-containing peptides, as well as arginine and tryptophan-containing  
peptides were demonstrated. Densitograms were plotted and typical peptide  
map charted. Chromatography was performed on 5-milliliter samples. No  
changes were found in proportion of different hemoglobin elements, but  
peptide T-25 reacted differently to tryptophan under the influence of  
radiation. Causes of appearance of anomalous proteins after irradiation  
are discussed. The demonstrated changes are attributed to structural  
impairment of the DNA molecule due to irradiation. Figures 6;  
references 29: 19 Russian, 10 Western.  
[62-10,657]

CHANGES IN RHYTHM OF CEREBRAL BIOPOTENTIALS RELATED TO EXPOSURE OF RABBIT'S HEAD TO MINIMAL LETHAL DOSE OF X-RADIATION

Tbilisi IZVESTIYA AKADEMII NAUK GRUZINSKOY SSR: SERIYA BIOLOGICHESKAYA  
in Russian Vol 6, No 1, Jan-Feb 80 (manuscript received 24 Mar 78) pp 72-77

FEYGIN, G. V. and NADAREYSHVILI, K. Sh., Institute of Physiology imeni  
I. S. Beritashvili, Georgian Academy of Sciences, Tbilisi

[Abstract] Chronic experiments were conducted on 16 chinchilla rabbits to determine whether local exposure of the head elicits quantitative changes in rhythm of bioelectric potentials of the somatosensory cortex, hippocampus, posterior hypothalamus and mesencephalic reticular formation, which had been previously demonstrated in the case of total-body irradiation (800 R, dose rate 24.5 R/min). A special program, "Poisk" [search] was used for parametric and nonparametric statistical comparative analysis using a computerized and automatic system. The animals were in a passive waking state during the experiments. Such irradiation elicited generalized activation of electrical activity of the above structures at the early stage and marked depression thereafter. The reactions were biphasic, unlike those observed with total-body exposure. The follow-up period lasted 20 days, and at the late stages thereof there was more marked electrical activity in the posterior hypothalamus, which was not the case with total-body exposure. It is theorized that in the latter case there is prevalence of reactions due to irradiation of the trunk and general somatic changes, and with exposure of the head alone the direct effects on the brain are prominent. The next report will deal with exposure of the trunk alone with shielding of the head. Figures 4; references 3 (Russian).  
[57-10,657]

SETTING HYGIENIC STANDARDS FOR INDUSTRIAL INFRASONIC WAVES

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 9, Sep 81  
(manuscript received 1 Aug 81) pp 8-11

[Article by G. A. Suvorov, I. B. Yevdokimova, E. I. Denisov and Ye. Yu. Shaypak  
(Moscow), Institute of Industrial Hygiene and Occupational Diseases, USSR  
Academy of Medical Sciences]

[Text] Research pursued in recent years revealed that early changes develop under the influence of infrasonic waves in the nervous, cardiovascular, respiratory, endocrine and other body systems (N. I. Karpova et al., 1979; N. I. Karpova and V. V. Glinchikov). Data have been submitted on the adverse and even hazardous effects of infrasonic waves. The chief problem in this area of research is to determine the level of infrasonic waves that should be considered safe to the body. According to some authors (Gono; Ising and Wittke), exposure to infrasonic waves at a level in excess of 170 dB for 10 min is lethal. At levels exceeding 150 dB, many undesirable processes start to appear: skin irritation and erythema, cough, asphyxia, pain upon swallowing and a number of other morbid symptoms. Some people experience severe malaise when exposed to 140-150 dB ultrasonic waves for 2 min, while others tolerate them with no symptoms. Disorders start to appear at levels of about 120 dB. Infrasonic waves of 110 dB have no overt stressor effects on the human body, but prolonged exposure to this level has an effect that is identical to exposure to frequencies in the audible spectrum. State standards have not been developed for limiting infrasonic waves. For the prevention of adverse effects of industrial factors on man it is important to provide scientific validation of safe standards in order to prevent occupational diseases and preserve work capacity.

We conducted complex hygienic, clinical-physiological and experimental studies to obtain scientific validation of principles for setting standards for infrasonic waves. We developed the "Methodological Instructions for Industrial Infrasonic Waves," to standardize methods of measuring them and the approach to evaluating them, which include specifications for equipment, physical characteristics and rating criteria.

We used the set of portable equipment of the (Bryul' i K'yer) Firm (Denmark) to measure infrasonic waves at work places, which consists of a 2204 pulsed audio-noise meter with No 4145 or 4146 microphones, 1613 frequency filter, the process being recorded on a measuring 7003 tape recorder. The oscillatory process was analyzed under laboratory conditions on type 3347 analyzer on a real time scale. We used sonic pressure in the octave bands of 2, 4, 8 and 16 Hz frequencies and



total oscillatory energy in "Linear" (Lin) decibels as physical criteria for setting standards. A tentative estimate of infrasonic waves was made according to the difference between levels in dB A and dB Lin using a first-class audio-noise meter. A difference of 20 dB or more between levels was evaluated as a marked infrasonic level.

Measurement and hygienic evaluation of infrasonic levels, which were made at the work places of operators of more than 100 pieces of equipment in different sectors of industry and transportation revealed that they are very common in the industrial environment. They were detected in electric steelmaking, open-hearth furnace and converter shops of metallurgical plants, compressor shops, in recovery of gold by the dredging method, in the electronics industry and others. Infrasonic waves were demonstrated in trucks, buses, trailers, passenger vehicles, bulldozers, excavators, towtrucks [or tractors], bucket-wheel excavators, river transport vessels, fork-lift trucks, dock cranes, subways and electric trains.

As a rule, the levels of infrasonic waves are at a maximum at the frequencies of revolution of electric engines, shafts and machines, but in 30% of the cases they are referable to the first harmonic of basic [master] frequency. It was also established that in 30% of the tested facilities of industrial enterprises without noise sources the level of infrasonic waves was higher than in premises with such sources. Such findings were made both in premises separated only by a wall from rooms with infrasonic wave sources and in rooms of buildings at a few dozen meters away from the building with a source. Infrasonic waves can go around large screens and, when they travel the same distance present less decay [damping] than audible noise. Thus, when a drop hammer is operated on the first floor the level of infrasound in an office on the third floor is 9-22 dB higher than on the first floor.

The degree of infrasound is determined by the proportion between levels of acoustic pressure in the low-frequency infrasonic and sonic parts of the spectrum. The personnel aboard river transport vessels, vehicle drivers, open-hearth furnace, converter, compressor shops and others are exposed to infrasonic waves. The average level of infrasonic vibration in industry and transport is 108 dB Lin with a noise level of 81 dB A; most commonly, one encounters infrasonic waves in the octaves of 8 and 16 Hz with levels of 87 and 101 dB, respectively. Shop equipment generates infrasonic vibrations of 78-97 dB, river transport vessels--75-99 dB, railroad transport--78-97 dB and dock equipment--79-91 dB. Consequently, most workers are exposed to infrasonic waves not exceeding 90-110 dB; however, some groups may be exposed to a higher level of infrasonic energy.

Clinical observation of the physical condition of 400 people in the most widespread occupations (taxi and bus drivers, operators in the steelmaking industry) failed to demonstrate marked pathology with exposure to 90-110 dB infrasonic waves.

Subjective evaluation of perception of infrasound, which was made by the method of questionnaires and gathering a history, established that essentially there were complaints characterizing a disturbance in the emotional and volitional area. These complaints were made by 30% of the drivers and 20% of the shop personnel. The complaints were systemic and progressed with increase in work tenure.

Objective neurological examination of the workers failed to demonstrate symptoms and syndromes that would be specific to the effects of infrasonic waves. The

observed deviations referable to reflex and autonomic functions were consistent with the symptoms of vascular dystonia. The asthenoneurotic reactions could be equally attributed to the effects of concomitant factors (intensity of the work process) and other elements. However, there was a considerably higher percentage of asthenoneurotic reactions among drivers than shop personnel.

Examination of the auditory analyzer failed to demonstrate any distinctions with regard to effects of infrasonic waves on the organ of hearing. There were signs of effects of noise on hearing among 11% of the examined shop personnel, which could be attributed to noise on a general level of 85 dB A. No occupational hearing pathology was observed among the taxi drivers.

We were impressed by the vestibulomotor changes, which were more marked among steel welders in open-hearth furnace and converter shops, who had no contact with vibration, than in vehicle drivers. Thus, sensitivity of the vestibular analyzer to galvanic current was twice as high in drivers than shop personnel and, conversely, it was higher for perception of linear accelerations. The clinical rotation test of Voyachek revealed hyperreflexia of somatic reactions (deflection of the arms and trunk by over 90°) in 34% of the steelmakers and 22% of the drivers. The severity and number of reactions increased with increase in tenure.

There was also more deterioration of equilibrium, which progressed with tenure, in the group of shop personnel. The stabilometric index of steelmakers with work tenure of 6-10 years was the same as in drivers with work tenure of 10-20 years ( $1.0 \pm 0.03$  and  $1.05 \pm 0.17$  arbitrary units, respectively). The demonstrated vestibulomotor changes related to occupation, which had some significance to development of motion sickness, could apparently be attributed to the specific effect of infrasonic waves, but this requires further investigation.

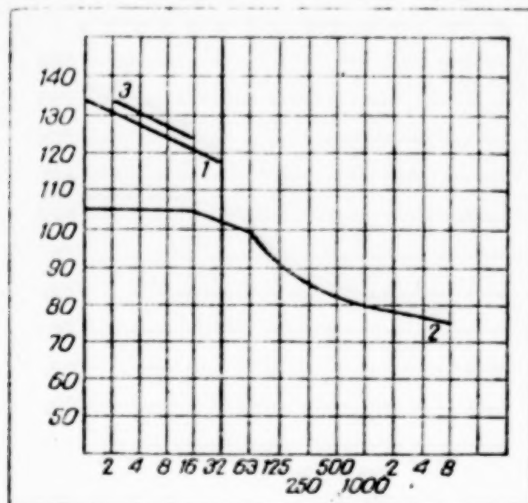
In view of the fact that it is not deemed possible to single out under industrial conditions the effect of pure infrasonic energy on the body as a system, much attention was devoted to experimental studies of the effects of infrasound on man. A sonic pressure chamber was developed for tests on volunteers, in which the industrial parameters of infrasonic waves were simulated. The experimental studies conducted at the Leningrad Sanitary and Hygienic Medical Institute, Institute of Industrial Hygiene and Occupational Diseases, USSR Academy of Medical Sciences, and at the Institute imeni F. F. Erisman revealed a number of distinctions.

Brief (15 min) exposure to infrasound at a level of 135 dB led to development of an inhibitory process in the central nervous system, reduction of work capacity, changes in the cardiovascular, respiratory and other systems; a level of 110 dB led to decrease in lability of the central nervous system, disruption of inter-central relations; 100 and 90 dB levels did not elicit statistically significant changes in any of the tested systems.

Prolonged exposure (60 min) to infrasonic waves at a level of 115 dB had a depressing effect on the central nervous system, cardiovascular, respiratory and endocrine systems, as well as a number of analyzer functions, with increase in severity of changes thereafter; 100 dB elicited an inhibitory process according to some parameters, while 90 dB did not lead to statistically significant changes.

Analysis of all of the obtained data from studies of industrial infrasonic waves, with consideration of the most common level of 90-110 dB Lin, the absence of

marked pathology under the effect of these levels, as well as of biological effect of ultrasonic waves under experimental conditions, made it possible to work out standards for limiting infrasonic waves, recommending 110 dB as the maximum permissible level on the Lin scale of the audio-noise meter and 105 dB in the octave frequency bands of 2, 4, 8 and 16 Hz. A level of 102 dB was suggested for a frequency of 31.5 Hz, for which standards have not been set in the audible range.



Permissible levels of infrasonic waves; y-axis, sonic pressure (dB); x-axis, mean geometric frequencies of octaves (Hz)

- 1) levels recommended by specialists at the Paris colloquium in 1973
- 2) those recommended by the Institute of Industrial Hygiene and Occupational Diseases, USSR Academy of Medical Sciences
- 3) those proposed by Johnson and Nikxon in 1973

we recommend have clinical and physiological validation for long-term exposure to levels that are common in the industrial environment.

### Conclusions

1. Industrial infrasonic energy is a widespread physical factor in the industrial environment, which has an adverse effect on health and work capacity.
2. Hygienic evaluation revealed that the intensity of infrasonic waves in the noise spectrum was determined by the correlation between levels of sonic pressure in the infrasonic and sonic parts of the spectrum, and it constituted 20 dB when tentatively estimated from the difference between A and Lin scales on the audio-noise meter.
3. The most widespread infrasonic waves in the industrial environment have maximum levels of 90-110 dB Lin, and investigation of the long-term sequelae thereof in

It should be noted that these standards constitute a preliminary hygienic estimate of the health hazard of infrasonic waves to workers, and they require further studies to correct the level as a function of frequency.

The Figure shows the permissible levels of ultrasonic energy proposed by the Institute of Industrial Hygiene and Occupational Diseases, USSR Academy of Medical Sciences, the Paris colloquium, as well as Nikxon and Johnson.

Our (G. A. Suvorov et al.; N. I. Karpova and E. N. Malyshev) analysis of the data of specialists dealing with validation of the standard curve revealed that these standards are based on short-term biological effects of high levels of infrasound, whereas the long-term effects of levels below 120 dB were not discussed. The levels recommended by Nikxon and Johnson for an 8-h work day were obtained by the calculation method from hearing VSP [expansion unknown] with exposure to infrasonic energy for 8 min. The levels

workers revealed a number of vestibulomotor disturbances and absence of marked specific pathology of the nervous, cardiovascular systems, cutaneous and auditory analyzer, or other systems of the body.

4. Infrasonic energy levels at work places must not exceed 105 dB in the octave bands at frequencies of 2, 4, 8 and 16 Hz, or 110 dB according to the general level on the Lin scale of the audio-noise meter; for a frequency of 31.5 Hz, for which no standard has been set in the audible range, 102 dB is recommended (approved by the USSR Ministry of Health on 12 December 1980, No 2274-80).

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COMPLEX PHYSIOLOGICAL AND HYGIENIC CHARACTERISTICS OF NEW WORK AND REST  
CONDITIONS AMONG SHIPS' CREWS

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[Abstract] Complex investigations were conducted on ships of the Latvian Shipping Company among ship personnel on a 10-hour schedule of watches and ship duties with reduced personnel. Crews of ships of the same class working on the same routes but with an 8-hour schedule were used as the control group. The work was carried out on four transport vessels during nine voyages to different regions of the world ocean. Work and rest conditions were studied, labor activity was analyzed by occupation and the psychophysiological and sociopsychological indicators were determined with objective biotelemetry recording. No significant differences in psychophysiological functions were determined when the control group and the test group of crewmen were compared. The new 10-hour schedule contributed to an increase of labor productivity, a decrease of personnel turnover, better control of one's working time in the fleet, an increase of crew qualifications and better sociopsychological climate among ship collectives. The degree of fatigue is considerably reduced if adequate opportunities are offered for rest on shore. This also contributes to a higher level of efficiency, strengthening of family activity and social activity of crewmen. References 4 (Russian).  
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